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THE UNIVERSITY OF ALBERTA

EFFECTS OF ENROLMENT ON JURISDICTION EXPENDITURES IN ALBERTA

by

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A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled EFFECTS OF ENROLMENT ON JURISDICTION EXPENDITURES
IN ALBERTA submitted by ROY GEORGE JAFFRAY in partial fulfilment of the requirements for the degree of MASTER OF EDUCATION in THE DEPARTMENT OF EDUCATIONAL ADMINISTRATION.

ABSTRACT

Revenues to Alberta school jurisdictions are largely dependent on per pupil grants. Therefore, enrolment factors such as jurisdiction size or enrolment change can have a direct effect on jurisdiction revenues.

School jurisdiction expenditures, on the other hand, are reputed not to be as directly related to enrolment factors. The purpose of this study was to determine what effects, if any, the enrolment factors, jurisdiction size and enrolment change, have had on expenditures in Alberta between 1975 and 1978.

Data were collected from the _Annual Reports_ and _Financial and Statistical Reports_ of Alberta Education. Pro-rated enrolments and expenditures per pupil in each of the reported budget programs (budget areas) were calulated. First, jurisdiction expenditures per pupil in each of the budget areas were tested for correlations with jurisdiction size and with enrolment change. Second, school jurisdictions were divided into eleven groups on the basis of size and three groups on the basis of enrolment change. Analysis of Variance methods were then used to determine if there were significant expenditure differences among the groups. Finally, using enrolment change from previous years as a covariant while again testing for differences among size groups, an attempt was made to determine if there was a one or two year lag in the effects of enrolment change.

Findings indicated that jurisdiction size had a differentiating effect on per pupil expenditures in only three budget areas: Operations and Maintenance, Administration and Transportation. The most significant of these was Transportation which was found to have a curvilinear relationship between jurisdiction size and expenditureper pupil. Jurisdictions in the middle size ranges had the highest expenditures.

Enrolment change was found to be a factor affecting expenditures in only one budget area: Capital Outlay and Debt Services. Declining enrolment jurisdictions were found to have expenditures per pupil which were significantly higher than increasing enrolment jurisdictions in this budget area. It was reasoned that the lack of significant differences, due to enrolment change, in all other budget areas, may have been due to the Declining Enrolment Grant in this province.

Finally, no lag in the effects of enrolment change was found.

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I. STATEMENT OF THE PROBLEM AND ITS SIGNIFICANCE

A. Introduction

The initial idea for this study was to focus attention on the effects of declining enrolments. Early investigations, however, showed that not all jurisdictions in Alberta have experienced declines. It was also found that total Alberta enrolments may not have declined during every one of the years 1975 to 1978 (the years of this study). Focusing only on declining enrolments, therefore, was too narrow. It was decided that the focus would be widened to include a study of both the differential effects of jurisdiction size (total enrolment) and of changing enrolments (increasing and decreasing enrolments) in the province. Emphasis in this thesis, therefore, was placed upon discovering the effects of jurisdiction size and enrolment change.

The focus of this thesis is the financial aspects of size and enrolment change. This study is limited to the financial effects of size and enrolment change on school jurisdiction expenditures.

This study, then, is concerned with the measurable expenditures of school jurisdictions and how they are affected by jurisdiction size and enrolment change. Chapter 1 presents the problem statement, an indication of its significance, and definitions of various terms used. Chapter 2 presents a review of the literature related to the

financial effects of enrolment size and change. Chapter 3 provides the conceptual framework and outlines the research design. Chapter 4 details specific research procedures and shows the results of statistical tests. Chapter 5 discusses the findings and conclusions for each area of expenditure. Chapter 6 summarizes the findings, discusses possible implications, and gives suggestions for further research in this area.

B. The Problem

To what extent have school jurisdictions in Alberta been affected, with respect to per pupil expenditures, by differential jurisdiction size and by changing enrolments?

Subproblem 1

To what degree are per pupil expenditures in each budget area directly related to jurisdiction size or to enrolment changes?

Subproblem 2

Are there differences among size groupings or among enrolment change groups and is there an interaction between the two factors which might affect per pupil expenditures in each budget area?

Subproblem 3

Do the changes in expenditures lag the changes in enrolment?

C. Significance of the Problem

Enrolments are an important factor in determining the distribution of revenues to Alberta School Boards. In Alberta, both the foundation grants and conditional grants are largely enrolment based. In 1977, for example, revenue from the School Foundation Program Fund (S.F.P.F.) and from provincial conditional grants equaled 579,791,270 dollars (Alberta Education, Financial and Statistical Report:1977). This was approximately 74 percent of all revenues to boards in Alberta.

The School Foundation Program grants rely on enrolment figures in three of their four major areas:

1. Instructional grants --- enrolment dependent
2. Transportation grants --- partially enrolment dependent
3. Administration grants --- dependent upon the above two grants
4. Debt Service grant --- not directly connected with enrolments

Richards (1979) writes concerning the 1978 School Foundation Program Fund:

> The foundation grant based on Instruction was a per-pupil grant which varied according to the number of pupils at each level (elementary-$1136, junior high - $1191, senior high - $1260)

The Transportation portion of the School Foundation Program Fund is determined by an allotment of a certain sum per student living more than 2.4 kilometres from school. The Administration portion of the grant is calculated as 3

percent of the total amounts allocated under Instructional and Transportation Grants. It is evident, therefore, that enrolment is an important factor in determining the S.F.P.F. grant to a school jurisdiction.

Conditional grants supplied by the provincial government, are also predominantly tied to school enrolments. Early Childhood Services grants, Language Program grants, Reading Materials grants, Special Education grants, are a few of the commonly applied for conditional grants which are determined on the basis of enrolment. Even the Canada Pension Plan grant is determined as being "$7.80 for each pupil enroled in grades I to XII inclusive,..." (Alberta, School Grants Regulations:1979). Enrolment, therefore, is an important factor in determining board revenues. One obvious corollary to this is that large enrolments mean large revenues. Small enrolments mean small revenues. Another corollary to this statement is that changing enrolments cause changing revenues. Declining enrolments cause declining revenues and increasing enrolments cause increasing revenues.

Expenditures on the other hand are not as closely tied to enrolment figures. In spite of equal funding per pupil, expenditures per pupil may or may not vary among jurisdictions. What exactly are the effects of jurisdiction size on expenditures? Are only certain budget areas (programs) affected? Providing answers to such questions was one of the goals of this thesis.

Swartz (1977:42) makes the following claim:

> The costs of educational programs are notoriously inelastic; the same overall level of expenditure is required over a range of total student numbers.

The inflexibility of expenditures also causes much concern with respect to declining enrolments. For example, the three major expenditure areas, instruction, maintenance and capital outlay, would appear to be relatively unresponsive to rapid change. Instructional expenditures do not decrease in a district which loses one student from each classroom. Such a decline would not justify releasingteachers. However, the loss of revenue from the S.F.P.F. grants alone could equal the salary of several teachers. Maintenance of the school plant would also remain relatively unaffected by the widespread loss of students. Expenditures for capital outlay might be affected in that new capital projects might not be approved but many capital expenditures such as vehicles, audio-visual equipment etc. might be unavoidable in spite of revenue decreases. These three areas of expenditure amounted to 84 per cent of total board expenditures as reported in 1977. Therefore at least 84 percent of a board's expenditures do not seem to fluctuate as greatly as its revenues, under conditions of enrolment change.

Despite this seeming incongruence between the reactions of revenues and expenditures, school boards must report a balance at the end of each fiscal year. On each audited annual report, the total expenditures will equal the total

revenues. How do boards manage to achieve this balance? Do deficits increase under declining conditions? Do surpluses commonly occur in times of rapid school population increase? Perhaps there are lagging effects which take up the shocks of sudden change? For example perhaps certain budget areas change one year after a revenue change. Questions such as these have surely occurred to policy makers and board members as they have worked to assess the impact of enrolment change. The fundamental question beneath all of these is, "How do changing enrolments affect a school board's expenditure of money?"

This study, therefore, is significant for three reasons. First, it investigates the possible effects of economies of scale. Second, it investigates the theoretical 'inflexibility of expenditures' in the face of changing enrolments. Third, it attempts to show differences in budget area expenditures in the province which may have been caused by conditions of differential size and varying declines and/or increases in jurisdiction enrolments.

D. Definition of Important Terms.

Most terms are defined in context throughout this thesis, but a few important ones are specifically defined below.

School Jurisdiction

School Jurisdiction is the term used in this study to describe a public school system in Alberta. It includes

school divisions, counties, public and separate (Roman Catholic) school districts, consolidated districts, and regional districts. It excludes private schools, which, although they receive some degree of public funding, are not considered public schoolsystems.

Enrolment

The enrolment of a school jurisdiction is the total pro-rated number of pupils (excluding Early Childhood Services pupils) receiving educational services in that jurisdiction. The enrolments have been pro-rated to make the enrolment figures fit the fiscal year. Forty percent of the September enrolment has been counted toward the year in which it was reported while the remaining sixty percent was added to the forty percent of the following year. This enrolment pro-ration provides that the per pupil expenditures will be measured according to the actual enrolments they were used for. Early Childhood Sevices (E.C.S.) is an exception. These enrolments are not reported in the normal manner and have not been used in this thesis. Instead, E.C.S. expenditures have been compared to the total jurisdiction enrolment.

Changing Enrolment

Changing enrolment will refer to an enrolment which varies by more than one percent from one year to the following year. The one percent boundary was chosen because it is the same boundary used by the Department of Education in setting conditions for the Declining Enrolment Grant

(Alberta, School Grants Regulations:1979).

Declining Enrolment

A declining enrolment is an enrolment which drops more than one percent below the enrolment of the preceding year.

Increasing Enrolment

An increasing enrolment is an enrolment which is more than one percent greater than the enrolment of the preceding year.

Jurisdiction Size

The 134 jurisdictions of this study have been divided into eleven groups based on size:

Group #	Pro-rated Enrolment	Number
1	19 to 174	n=14
2	175 to 299	n=15
3	300 to 499	n=13
4	500 to 799	n=12
5	800 to 1199	n=11
6	1200 to 1799	n=16
7	1800 to 2299	n=16
8	2300 to 3199	n=13
9	3100 to 4999	n=11
10	5000 to 9999	n= 7
11	10000 to 81041	n= 5

Except for groups 10 and 11 the groups represent roughly one decile each. Because of the great range in the last decile, it was divided into two groups numbered 10 and 11. In this thesis jurisdictions are sometimes refered to as 'group 5 jurisdictions',etc.. This refers to the above size grouping.

Per Pupil Expenditure

The per pupil expenditure is based upon the expenditure of each school jurisdiction in each budget area divided by the pro-rated enrolment in that school jurisdiction which

affects that budget area; e.g., Instruction expenditures for grades 1-6 were divided by the pro-rated grade 1-6 enrolment.

Budget Area

In the annual Financial and Statistical Report of the Department of Education, (1974-1978), fourteen categories of expenditures (or "functions")are reported for each jurisdiction. They are:

1. Early Childhood Services
2. Elementary Instruction
3. Junior High Instruction
4. Senior High Instruction
5. Special Education
6. Community Services
7. Pupil Personnel
8. Administration
9. Operations and Maintenance
10. Transportation
11. Capital Outlay and Debt Services
12. Total Operational Expenditures
13. Surplus (or Deficit)
14. Total Expenditures

These are the Fourteen "budget areas" which will be used for various analyses in this study.

A definition of each budget area is given below. (These are adopted from the Program Accounting and Budgeting Classification and Coding Manual, Alberta Education, 1975).

1. Early Childhood Services Early childhood Services expenditures include funds provided for pre-school activities and experiences and for parental training in the development of Early Childhood Services.
2. Elementary School Instruction This budget area includes all expenditures toward the instruction of students, such as teacher salaries, library expenses, teaching supplies, etc., in the elementary grades of a jurisdiction.
3. Junior High School Instruction This budget area is the Junior High level equivalent of the Elementary School Instruction budget area.
4. Senior High School Instruction This is the Senior High level equivalent of the Elementary School Instruction budget area.
5. Special Education This budget area includes classes and services provided for the following groups:
    - educable mentally retarded
    - hearing impaired
    - visually impaired
    - trainable mentally Retarded
    - gifted
    - hospital and homebound
    - learning disabilities.
6. Community Services includes expenditures on such activities as:
    - adult education

- recreation classes
- evening credit classes
- community recreational services.

7. Pupil Personnel Services includes:
   - guidance and counselling services
   - social and psychological services
   - co-curricular activities
   - food services
   - health services
8. Administration includes all expenditures on:
   - central office administration
   - school administration
   - development of facilities
   - computer services
   - information and communications
   - staff development
9. Operation and Maintenance includes all expenditures on the operation and maintenance of:
   - buildings
   - grounds
   - equipment and furniture
   - vehicles(except buses)
10. Transportation This budget area is concerned with the transportation and boarding of pupils.
11. Capital Outlay and Debt Services Debt Services includes all expenditures toward the repayment of principal and interest on borrowed funds. Capital

Outlay includes all expenditures from current revenues toward capital purchases, i.e. purchases which are not consumed and which last for a period of more than one year. Examples of common expenditures which are reported under the capital outlay budget area are land, vehicles, film projectors and shop machines.

12. Total Operational Expenditures includes a total of all the areas mentioned above. It does not include surplus funds.
13. Surplus equals total revenue minus total operational expenditures It is the amount of money remaining after expenditures at the end of the fiscal year. In this thesis deficits have been recorded as negative surplus expenditures.
14. Total Expenditures equal total operational expenditures plus surplus. It is also equal to the total revenues for the year. This is the budget item which must balance with the total revenues for the year no matter what the change in revenues (possibly due to enrolment change) may have been.

Lagging Effects

Lagging effects will refer to instances where enrolment change may precede the expenditure change and therefore cause related statistics to be reported in different years. For example, declining enrolments may be found in jurisdictions two years before a large decrease in per pupil

expenditures.

Interaction Effects

Interaction effects are effects which occur when two or more characteristics, such as size of jurisdiction and degree of enrolment change, working together, have an effect on per pupil expenditures, which could not be accounted for by looking at each characteristic individually.

ANOVA

ANOVA in this study will refer to the statisical test called Analysis of Variance.

ANCOVA

ANCOVA in this study will refer to the statistical test called Analysis of Covariance.

E. Summary

Chapter 1 has outlined the major purpose of this study, that is, to measure the effects of jurisdiction size and changing enrolments on school jurisdiction expenditures in Alberta. Three subproblems were introduced to focus attention on various aspects of the problem, such as relationships, differences, interaction effects and lagging effects.

The significance of the study was that of providing a vehicle to test the claim that expenditures are less flexible than revenues. This study may be able to suggest how 'flexibility of expenditures' may have been achieved under conditions of necessity.

Finally, definitions of terms, which have been used frequently in the remainder of this thesis have been included.

II. RELATED LITERATURE

A. Introduction

In this chapter various studies giving insight into size, enrolment change and per pupil expenditures are reviewed. The studies in the first section stress equality and lay heavy importance on enrolment factors in determining expenditure differences. The studies in the second section indicate some of the effects of jurisdiction size on educational finance. The enrolment studies in the third section present statistics showing the patterns of enrolment change in the United States and Canada. Included in the fourth section are studies which emphasize the financial effects of declining enrolments. This is followed by two analyses of per pupil expenditures which were influential in determining the directions of this study.

B. Equality

Basic to this study is the concept of equality. Moffatt (1957:45,46)in stating the basic principles of thought on educational finance in Canada writes:

> The principle of equality of educational oppurtunity, developing since the beginning of the century, is now firmly established. Our people believe that differences between poor and wealthy communities and between highly organized communities and sparsely settled rural areas must be reduced or eliminated.

Moffatt gives historical justification for finding out if there are any inequalities among school jurisdictions.

Alberta Education (1975:2) in a report by the Ministers Advisory Committee on School Finance officially recognized the importance of educational equality. The following was given as a part of its terms of reference:

> In its developmental work the Committee shall focus primarily on the differentiation of support .... This shall involve ... identification and measurement of factors which can and do contribute to and undermine district by district differences in unit expenditure.

The committee's terms of reference show justification for a study aimed at finding factors which effect financial equality among school jurisdictions.

Richards (1979) reviewed the foundation program introduced in this province in 1961 to finance the school systems of the province. A foundation program was expected to allow each school board the fiscal capacity to initiate a minimum basic level of education thoughout the province. In 1968 the foundation program was changed from a formula-based grant to a weighted per pupil grant. Richards claims that this change gave boards less discretionary power in changing the value of the foundation grant.

Richards further indicates a proliferation of conditional grants. These conditional grants are seen as an encroachment upon the basic ability of boards to meet their own specific needs. Boards are forced to draw additional money from the foundation grants or other sources to meet the remaining cost of programs partially paid for by conditional grants.

The question which arises from this review of the literature is: Have increasing numbers of enrolment-based grants in this province resulted in less fiscal equality?

C. Jurisdiction Size

The School Business Officials of Alberta (1976) reported a study to the Department of Education which was based on the above question of existing equality in Alberta.

> The initial purpose of the studies was to provide comparitive cost statistics for Alberta School Jurisdictions which point out possible cost differences due to:
>
> 1. type of jurisdiction
> 2. size of the student population
> 3. density of student population
> 4. location within the province
>
> By analyzing the results for a variety of cost items, the committee endeavored to identify factors which contributed to higher or lower per pupil costs.

The findings of this report reveal some interesting patterns of disparity among jurisdictions. For example in the budget area of transportation, jurisdictions in zone 6 were found to have the highest per pupil expenditures while those in zone 5 had the lowest. This disparity was expected to be minimal between zones because the province provides funds for each student who must travel more than 2.4 kilometers to school (part of the S.F.P.F. Grant) irrespective of zone boundaries.

This report also mentions that conditional grants, for small schools and for declining enrolments, are fulfilling a need, particularly in the rural areas of eastern and northern Alberta. This implies that, because of the

Declining Enrolment Grant, fewer disparities in per pupil expenditures should be found.

Bumbarger and Ratsoy (1975) identify certain characteristics which may help distinguish groups of jurisdictions suffering from unequal financing. The study was designed to discover some of the significant dimensions related to financing problems upon which small schools and small school systems differed from other schools and systems. Five variables were chosen as differentiating factors:

1. size of jurisdictions
2. sparsity of population
3. remoteness of schools from each other within the jurisdiction
4. isolation from urban centers
5. number of small schools within the jurisdiction.

They found that very small jurisdictions differed significantly from slightly larger jurisdictions. There were also differences by level of operation. For example, very small jurisdictions had a larger difference in per pupil expenditure between secondary and elementary levels than did larger jurisdictions

Bumbarger and Ratsoy (1975:73) identified certain "need categories" of jurisdiction sizes. Jurisdictions with enrolments below 500 students were in the first need category. These were identified as small jurisdictions. Enrolments between 500 and 1500 students were in the next

category. To some degree these two categories have been taken into account in the size groupings of this study.

D. Shifting Enrolment

Lucas (1977) examined enrolment trends in the urban centers of the United States between 1971 and 1976. His statistics indicate that while some school boards experienced decline others experienced growth. Below are some of the extremes:

Indianapolis, Ill..........declined.........20.0%
St. Louis, Mo..............declined.........22.6%
Boston, Mass...............declined.........22.0%
Denver, Colo...............declined.........23.3%
Seattle, Wash..............declined.........21.0%
Ft. Lauterdale, Fla........grew.............12.6%
Tampa, Fla.................grew.............11.5%
Las Vegas, Nev.............grew.............10.7%
Lakewood, Colo.............grew.............12.5%

It is apparent that, during a general enrolment decline, some jurisdictions are growing. Is there a resulting significant difference in the per pupil expenditures?

Fast (1978) did a comparable study of enrolments in Canada for the same period of 1971 to 1976. His statistics show that Canada is in a similar situation of some decline and some growth occurring at the same time:

Montreal (Catholic)	declined	57,951	(26.4%)
Toronto	declined	13,887	(12.7%)
Vancouver	declined	9,470	(12.9%)
Quebec(Catholic)	declined	9,456	(30.2%)
Toronto(Separate)	grew	9,437	(11.5%)
Calgary	grew	(amt. not given)	(5.2%)

A similar situation exists within the province of Alberta. There are both declining and growing jurisdictions within the province:

Wainwright	declined	(16.00%)
Provost	declined	(13.9%)
Edmonton Public	declined	(10.6%)
Neutral Hills	declined	(24.1%)
Taber	declined	(9.8%)
Calgary Public	grew	(2.4%)
Strathcona	grew	(36.6%)
Parkland	grew	(41.6%)
Lethbridge	grew	(0.3%)

(Figures derived from the Alberta Education Annual Reports for 1972 and 1977.)

These statistics pose another question: Has a split occured between the growing and the declining jurisdictions in Alberta, with reference to per pupil expenditures?

How long will conditions of enrolment decline or at least enrolment fluctuation exist in this province? Lucas (1977) claims 1983-84 as the turn around year in the United

States . Fast (1978) cites 1984 in Canada. Both of these seem simplistic however, in that they do not take into account the fact that this "turn around year" will not occur in every grade, jurisdiction or province at exactly the same time. The population wave will take time to work its way through the system. Zsigmond and Wenaas (1970:19) illustrated the concept of a population wave.

> A wave of population swept through, first, the elementary schools and then the secondary schools in the 1950's and 1960's and now is thundering on to the post secondary level, with differing effect on each educational level.

During the latter part of the seventies and during the first half of the eighties we have been, and will be experiencing the trough following the wave spoken of by Zsigmond and Wenaas. Alberta Education (1978:8) in its Annual Forcast of School Enrolments 1978-1987, showed that elementary enrolments began to increase in 1978 and will reach their previous high again in 1984. Junior high enrolments will "bottom out" in 1980 and should not reach their previous highs until 1987 or 1988. High school enrolments will continue to decline until somewhere between 1981 and 1983 and may regain the high point in 1986. These figures show that the problems of fluctuating enrolments will exist primarily during the first half of this decade.

E. Declining Enrolments

This section of the literature review deals with opinions associated with declining enrolments rather than merely enrolment statistics as in the section above.

Divoky (1979) writes about the frustrated taxpayer and his expectations:

> Taxpayers saw declines not so much as an oppurtunity to improve schools as a way to keep money in their own pockets. Schooling costs so much per child, the theory went, and fewer children would mean fewer tax dollars.

She also writes that declining enrolments did not result in lower overall costs. "The gurus of decline say it takes about 10 years for a district to realize any substantial saving from retrenchment after enrolment decline." (Divoky, 1979) The conclusion reached by Divoky is that many of the woes blamed on declining enrolments are partially the result of other factors and trends. This indicates that any study of declining enrolment should look for interaction effects with other factors (such as size for example).

James (1977) expects the per pupil costs of education to continue to rise as enrolments drop because boards will be reluctant to make difficult decisions such as staff reductions or school closures. He writes that since rates of decline will be lower than average in rural or suburban jurisdictions, urban schools can expect greater declines than the averages projected. James seems to believe there will be an urban/suburban/rural differentiation in the enrolment trends.This appears to be another valid avenue of

investigation but the scope of this study does not permit a direct investigation of the effects of the rural/suburban/urban variable.

Atherton (1977) is concerned with enrolment-based financing:

> A financial structure based on enrolment concerns only could result in a reduction of services in areas of rapidly declining enrolment to the point where a concept of educational equality disappeared even if the overall system was expanding.

Atherton therefore is concerned about programs such as Alberta's School Foundation Program Fund which are largely enrolment-based.

Atherton (1977) also makes a relevant observation about patterns of enrolment change:

> Projections of aggregate populations tend to obscure local or regional patterns of increase and decline which increase educational problems.(1977)

In other words, large national or provincial enrolment projections hide the fact that some jurisdictions are growing and some are declining more rapidly than these publshed averages.

Finally, he makes the claim that many of the expenditures of boards are independent of enrolment, such as increasing teachers salaries due to increased experience or higher degrees of teacher certification. As a result, he claims, "there is a tendency of school boards to reduce the amount of special needs met when overall income is reduced".

Schwartz (1977:41-44), in a report on delining enrolments prepared for the Educational Research Institute

of British Columbia, claims that revenues are very sensitive to enrolments while expenditures are "notoriously inelastic". He writes that the benefits of economies of scale, under a foundation program, accrue to districts with large enrolments. Decline in enrolments proportionately wipe out the benefits of economies of scale. Intuitively then, the smaller district with a declining enrolment will suffer more than the large district with a similar percentage of decline.

Schwartz also reports findings of a curvilinear relationship between size of district and cost per pupil. A strong negative correlation is reported to exist between the per pupil costs and the enrolment in all but the largest jurisdictions. These largest jurisdictions have higher per pupil costs in spite of their enormous size. In other words they do not benefit as much from economies of scale as do smaller (but still large) jurisdictions.

This curvilinear relationship was found in budget area expenditures as well as total expenditures. He writes:

> ...administrative costs are greatest, on a per pupil basis, in the smallest districts, falling as enrolments increase until in the largest districts the trend reverses itself (1977:41).

Jackson (1978) recommends temporary declining enrolment grants on the grounds that in a few years jurisdictions will adjust to the new economics of decline and that the savings expected from declining enrolments are only posponed, but not forgone. Jackson appears to have a contrary opinion in the literature of declining enrolment. He is cited here to

show that there are those who believe that declining enrolments have little lasting effect on the costs of education. If he is right, it is possible that there will be found, at this late date, little evidence of per pupil expenditure differences caused by declining enrolments. Results of this study could show that fluctuating enrolments play an insignificant role in separating jurisdictions into groups on the basis of expenditures.

F. Per-Pupil Expenditure Analyses

The following are two studies on per pupil expenditures which have been helpful in formulating this study.

Fennell (1972) collected the data of several other studies done at the time. He did a cost analysis of 69 schools in Alberta. Using descriptive statistics as a tool he found that the per pupil costs tended to be higher in urban schools than in rural schools in all budget areas except pupil transportation. He also found that instructional expenditures tended to be higher in higher grades. If these findings continue to be true, this study can be expected to find lower per pupil expenditures for small jurisdictions in all budget areas except transportation. High school per pupil expenditures can also be expected to be higher than elementary or junior high per pupil expenditures.

Meek (1979) was concerned primarily with effects of enrolment decline on revenues and expenditures in those

jurisdictions which had declining enrolments in Alberta. He was also concerned with examining policy implications for provincial public school support. Meek (1979:175) found that:

> declining enrolment was found to produce fiscal inequity in declining enrolment jurisdictions since such jurisdictions were unable to adjust expenditures downward to match declining enrolment revenue losses, as follows:
>
> 1. School jurisdictions could not adjust swiftly.
> 2. Jurisdictions adjusted differentially by size (as measured by total enrolment);
> 3. Some jurisdictions did not adjust at all and some jurisdictions increased real expenditures in the face of declining enrolment revenue losses; and
> 4. Jurisdictions with enrolment declines below 1.0% appeared to experience as much difficulty adjusting expenditures downward as did those with declines above 1.0%.

Central to the present study was the finding by Meek (1979:175), that "a situation of fiscal inequity was found for those school jurisdictions with declining enrolments." The unanswered question is: Are there certain sizes of jurisdictions which are more affected by declining enrolments? Meek investigated one aspect of this question. He found that small jurisdictions, i.e., those under 1501 students, had the most difficulty in adjusting and that with the exception of the largest jurisdictions, those over 4500, size was an important factor in the ability of jurisdictions to adjust to decline.

The present study and Meek's disertation have several parallels. For this reason it is beneficial to list the differences:

1. Meek dealt with the period of 1971 - 1975. The present study updated his study by dealing with the period 1975 -1978.
2. The present study deals with not only the differentiating effects of decline but also with those of growth.
3. The present study does not attempt to be prescriptive but rather merely descriptive in discussing enrolment factors which contribute to fiscal inequality.
4. Meek used regression analysis to find relationships between size, enrolment decline, and expenditure. This study uses analysis of variance techniques to find differences between sizes of jurisdictons with regard to per pupil expenditure. Essentially, the two techniques are related but the approach to the problem is different.

G. Summary

In this chapter the literature relating to this study has been grouped into the following categories:

1. Equality
2. Jurisdiction size
3. Enrolment studies
4. Declining enrolments
5. Per Pupil Expenditure Analyses

In the studies on equality, it was shown that Canadians in general, and Albertans in particular, seek equality in educational expenditure. The foundation grant system, the conditional granting system and the existence of such studies as that by The School Business Officials of Alberta (1976) and that on small schools by Bumbarger and Ratsoy (1975) are indications of this desire for provincial equality.

The enrolment studies showed that declining enrolments will continue, generally, until the middle of this decade. These studies also established the fact that national or international trends do not necessarily reflect the local situation. In other words, local enrolments tend to increase or decrease more drastically than national averages.

The declining enrolment reviews gave insight into some of the financial effects of declining enrolments. Generally it was believed that enrolment declines would increase the per pupil costs because expenditures were not flexible enough to drop with revenue losses. One writer, Jackson, presents the view that per pupil expenditure increases are only temporary.

The results of studies on the financial effects of enrolment changes in two per pupil expenditure analyses which have been done in Alberta were presented. The relationship of those studies to this one was shown.

III. CONCEPTUAL FRAMEWORK AND DESIGN OF THE STUDY

A. Introduction

This chapter presents the basic concepts and design of this study. In the section entitled 'Conceptual Framework' the variables used in this study and their relationship to each other are given. Under the section 'Design of the Study', three tests, used to answer the question posed by the problem of this study, are introduced. Under sections entitled 'Data Collection' and 'Data Transformation' procedures used to collect raw data and transform them to final form are explained briefly. Finally the assumptions, delimitations and limitations are given.

The basic concept of this study is to measure the the effects of jurisdiction size and enrolment change on per pupil expenditures under each of the reported budget areas between the years 1975 and 1978.

B. Design of the Study

Three methods are used to investigate the effects of jurisdiction size and enrolment change on per pupil expenditures.

1. The first method looks for correlations showing the relationship of per pupil expenditures to the above two factors, enrolment change and expenditure per pupil. These correlation coeficients were used to indicate which budget areas might be most affected

(in a linear manner) by the two factors.

Not only correlations for "expenditures per pupil" but also correlation coefficients for "change in expenditures per pupil" were determined. The additional information generated by this dimension did not indicate significant new information so was not used further in this study.

2. The second method involved looking for significant differences among the means of jurisdiction size groups and among the means of enrolment change groups. Several tests were involved in this method. A simple one-way analysis of variance test (ANOVA) was used to find differences among groups. An ANOVA test with repeated measures was used to add strength to these findings. A two way ANOVA test was used to find interaction effects between jurisdiction size and enrolment change. The main effects of each factor were used to verify the previous tests. Finally, an analysis of covariance test (ANCOVA) was used. In this test for differences among size groups, the effects of enrolment change were, in effect, removed. By comparing the results of the one-way ANOVA test with the results of the ANCOVA test it was expected that the removal of the effects of enrolment change would be evident in the differences between resulting F-ratios.
3. The third method is merely a repetition of the

ANCOVA test using enrolment change data from previous years as the covariant. The results of this method show the effects of removing the influence of a previous year's enrolment change from per pupil expenditures. This method was used to indicate if there was a lag in the effects of enrolment change.

C. Data Collection

The Annual Report as published by Alberta Education (1975-1979) contained the enrolment data used for this study. Elementary, junior and senior high enrolments for every jurisdiction in the province were printed in these reports under the table entitled "Operation of Schools by School Divisions, Counties and Independent Districts."

The Financial and Statistical Report compiled by the Field Services Branch of Alberta Education (1975-1978) was used as the source of expenditure data found in this study. Under the title "Operating Fund Expenditures" data were collected on every publicly funded school system in Alberta. That data included expenditures in every budget area as defined in chapter one. Under the title "Operating Fund Revenues" data were collected showing the amount of any deficits incurred for each school jurisdiction.

The data on enrolments, expenditures and deficits for each of the years 1975-1978, were transferred to computer cards and then stored in a computer file. This file contained eighteen lines of data for each jurisdiction.

[illegible]

[illegible]

[illegible]

> [illegible]

D. Data Transformation

The enrolment data were transformed from school year enrolments (i.e., from September to June) to pro-rated (fiscal year) enrolments. Expenditure data were then transformed into per pupil expenditure form. Methods for deriving pro-rated enrolments and per pupil expenditures are described in detail in chapter 4.

The data, therefore, on which statistical tests were performed, consisted of pro-rated enrolments of each school jurisdiction and the per pupil expenditure in each budget area for each school jurisdiction.

E. Assumptions

It was assumed that per pupil expenditures calculated from pro-rated enrolments, January to December, represent a truer measure of actual per pupil expenditures than if they were calculated on the basis of the reported enrolment, September to June, because the pro-rated enrolment more closely coincides with the average enrolment during the fiscal year.

For the purpose of this study it was assumed that expenditure data represent the costs of education and that equal expenditures per pupil represent equal educational opportunity for the pupils involved. This assumption allows the study to avoid the sociological questions of differential funding to create equal educational

opportunity.

It was assummed that the two expenditure columns entitled 'Debt Services' and 'Contribution to Capital Fund', as reported in the 1974, 1975 and 1976 Financial and Statistical reports, are equivalent to the single expenditure column entitled 'Capital Outlay/Debt Services/ Transfers'.

F. Delimitations

This study was delimited to descriptions of financial history rather than prescriptions for change.

This study was delimited to financial analysis and did not concern itself with questions of educational opportunity or quality except for the assumption (stated above) that equal expenditure is equivalent to equal oppurtunity.

This study was delimited to data from the years 1975 to 1978 inclusive for the following reasons:

1. The Declining Enrolment Grant (School Grants Regulations 1979) was introduced in 1975. This study therefore dealt with the period following the introduction of provincial measures to adjust for declining enrolment effects.
2. This study was delimited to an investigation of public and separate (Roman Catholic) school jurisdictions and therefore did not include private schools, Department of National Defence schools or publically funded special education schools such as

the Alberta School for the Deaf.

3. At the time of writing, these were the most up to date published data available.

Finally, this study was also delimited to only those school jurisdictions which have reported operating schools in all four of the years examined. This also excludes the school jurisdictions which temporarily operated under the name Bow Corridor (i.e. Banff, Exshaw, Seebe and Canmore) and the new jurisdiction Spruce Grove. Bow Corridor jurisdictions are not included because of the problem of dividing their expenditures while under Bow Corridor and the opposite problem of removing the expenditures of non-operating jurisdictions from the operating ones while they were united. Spruce Grove was not included because it did not exist during the first year of the study.

G. Limitations

Because of the unique demographic characteristics on which the data are based, the findings of this study cannot be generalized to other provinces. It must also be noted that the conclusions of this study are not transferable to questions of educational quality. Equality of educational quality or opportunity is a much broader and more complex issue than the scope of this study would allow.

Another limitation to this study lies in the fact that the data in this study are subject to problems of unknown comparability between jurisditions for expenditures reported

within the same budget area.

H. Conclusions

In this chapter the conceptual framework and design of this study have been briefly outlined. Three major variables were identified: jurisdiction size, enrolment change and per pupil expenditure. The basic concept of the study was to measure the effects of jurisdiction size and enrolment change, on per pupil expenditure. The design of the study consisted of three methods to discover:

1. the correlation between jurisdiction size and per pupil expenditures and between enrolment change and per pupil expenditures,
2. if there are differences in per pupil expenditures among various groupings of jurisdictions with and without adjustments for enrolment change, and
3. if there is a lag between the enrolment change and its effects on per pupil expenditures.

Methods of data collection and the transformation of the data to usable forms were shown. Finally the assumptions, delimitations and limitations of this study were given.

IV. DETAILED RESEARCH PROCEDURES

A. Introduction

Although some of the research procedures were briefly introduced in the previous chapter, under the headings data collection and data transformation, all of the procedures are presented in detail in this chapter. These procedures roughly involved eight broad steps:

1. Extraction of necessary enrolment data.
2. Extraction of necessary financial data.
3. Preparation of data for computer analysis.
4. Data transformation.
5. Preliminary Investigation of Descriptive Statistics.
6. Analysis of subproblem 1.
7. Analysis of subproblem 2.
8. Analysis of subproblem 3.

These are dealt with in this chapter.

B. Enrolment Data

Enrolment data were taken directly from the tables entitled "Operation of School Divisions, Counties, and Independent School Districts" in the appendices of the following reports of Alberta Education:

1. The Seventieth Annual Report 1974-1975.
2. The Seventy-First Annual Report 1975-1976.
3. The Seventy-Second Annual Report 1976-1977.
4. The Seventy-Third Annual Report 1977-1978.

5. The Seventy-Fourth Annual Report 1978-1979.

Four categories of enrolment data were extracted for each operating jurisdiction in each year:

1. Elementary enrolment as of September 30.
2. Junior High enrolment as of September 30.
3. Senior High enrolment as of September 30.
4. Total enrolment as of September 30.

In total this made twenty items of enrolment data for each operating jurisdiction over the five years for which data were collected.

Data from school jurisdictions classified as 'not operating' were not extracted from the reports.

C. Financial Data

Financial data on expenditures were taken directly from the tables entitled "Operating Fund Expenditures" in the following reports by the Field Services Branch of Alberta Education:

1. Financial and Statistical Report of Alberta School Boards. Fiscal year 1974 (January 1-December 31).
2. Financial and Statistical Report of Alberta School Boards. Fiscal year 1975 (January 1-December 31).
3. Financial and Statistical Report of Alberta School Boards. Fiscal year 1976 (January 1-December 31).
4. Financial and Statistical Report of Alberta SChool Boards fiscal year 1977 (January 1-December 31).
5. Financial and Statistical Report of Alberta School

Boards fiscal year 1978 (January 1-December 31, 1978).

Expenditure data were extracted for operating school jurisdictions in fourteen budget areas. These were:

1. Early Childhood Services
2. Elementary Instruction
3. Junior High Instruction
4. Senior High Instruction
5. Special Education
6. Community Services
7. Pupil Personnel
8. Administration
9. Operations and Maintenance
10. Transportation
11. Capital Outlay and Debt Services
12. Total Operational Expenditures
13. Surplus or Deficit
14. Total Expenditures

Jurisdictions were judged to be "operating" if they were found to have expenditures under the budget categories, Elementary, Junior High, or Senior High Instruction and also under the budget category Operations and Maintenance. In total over seventy items of financial data were extracted for each operating school jurisdiction.

D. Preparation Of Data For Computer Analysis

At this point it was found that certain jurisdictions had to be removed from the study because of a lack of complete data. Ralston, Canadian Forces Base, Mynarski and Biggin Hill (Medley) are excluded from this study because, being under Federal supervision, they do not report finances in the Financial and Statistical reports of Alberta Education (only enrolment data were available).

Banff, Exshaw, Seebe, and Canmore were excluded from this study because of inconsistent reporting formats. Reports from these jurisdictions for 1974 and 1978 were recorded under each jurisdiction. During the intervening years, however, these jurisdictions were consolidated under one jurisdiction, Bow Corridor. Because it was difficult at the time to determine if these were the only jurisdictions reporting under Bow Corridor, the data for Banff, Exshaw, Seebe, Canmore and Bow Corridor were excluded from this study.

St. Rita's Catholic School District stopped operating as of September 1976. Because St. Rita's had no enrolment in 1978 it is not included in the school jurisdictions of this study.

Exclusion of the data from the above nine jurisdictions resulted in a final list of 133 operating school jurisdictions (see Appendix I). Each of these jurisdictions was given a code number. The data for each jurisdiction were keypunched on to eighteen computer cards. These data were

then read into the computer and stored in a computer file. The file was spot checked for accuracy and all code numbers were rechecked for possible coding errors.

E. Data Transformation

The enrolment data were not parallel with the financial data with reference to the time periods reported. Therefore it was decided to pro-rate the enrolment data in such a way as to create an enrolment figure which could be a close approximation of the number of students for which the fiscal year expenditures were made. The two examples below will serve to illustrate how the enrolments were pro-rated (the first example is general; the second more detailed):

> First Example
>
> Sixty percent of the 1975-76 enrolment added to forty percent of the 1976-1977 enrolment equalled the pro-rated enrolment for 1976. Sixty percent of the 1975-76 year was used because six of the ten school months of 1976 are represented in the 1975-76 enrolment figures. Forty percent of the1976-77 year was taken because four of the ten school months represented by the 1976-77 enrolment occurred in 1976. Thus the new 1976 pro-rated enrolment coincides more closely with the 1976 fiscal year expenditures.
>
> Second Example
>
> The total enrolment for Neutral Hills School Division was 657 as reported in September 1974 and 612 as reported September 1975. Total Expenditures for the fiscal year 1975 (Jan. 1 to Dec. 31) were $988,318.
>
> Sixty percent of 1974 (60% x 657 = 394.2)
> plus
> Forty percent of 1975 (40% x 612 = 244.8)
> equals 1975 pro-rated enrolment (639).
>
> The pro-rated enrolment, 639, is thought to coincide more closely with the number of pupils for which the $988,318 was spent during the fiscal year January 1 to December 31, 1975

A disadvantage found in pro-rating the data was that the first year of data, 1974, is thus lost to further comparative analysis. Sixty percent of the enrolment data collected for 1974 is absorbed in the pro-rated 1975 enrolments. It was not possible to determine 1974 pro-rated enrolments because 1973 enrolment data had not been collected.

An example of pro-rated enrolments can be seen in Appendix I. Pro-rated enrolments for 1978 for each of the 133 jurisdictions used in this study are listed. The 1978 enrolments are shown as an example of the pro-rated enrolments because they were used as a basis for dividing the 133 jurisdictions into eleven size groupings.

The jurisdictions, as listed in Appendix I, were divided into approximate decile size groupings. It was thought to be more desirable to find some logical divisions between groups therefore the number of jurisdictions in each group was not limited to exact decile divisions. In other words when five or six jurisdictions each had a similar number of students, they would be grouped together, even though a decile division would normally go between them. Those jurisdictions which fell into the tenth decile were an anomaly. There was an extreme difference between the smallest and the largest jurisdiction in this group. It was decided to divide this group into two groups, each with fewer jurisdictions but each slightly more comparable with respect to size. In the end eleven size groupings emerged

based on the 1978 pro-rated enrolment results.

The next step in transforming the data into usable form was to change the expenditure data to expenditure per pupil data. This was accomplished by dividing each jurisdictions expenditure in each budget area by the pro-rated enrolment of that jurisdiction. Elementary, junior high, and senior high expenditures were divided respectively by elementary, junior high and senior high enrolments. All other budget areas were divided by total jurisdiction enrolments.

F. Descriptive Statistics

Once the per pupil expenditures were determined for each jurisdiction, means and standard deviations were calculated to give an idea of the configuration of the data. Table 1 shows the mean expenditure per pupil in each budget area during the years 1975-1978. This table presents some interesting features.

1. Notice that senior high expenditures are consistently higher than elementary or junior high.
2. The range of expenditures, as indicated by the standard deviations, was much broader in senior high instruction.
3. The Community Services' mean per pupil expenditure is decreasing in its yearly expenditure per pupil.
4. The mean expenditure in Operations and Maintenance in 1978 ($235.17) is 1.51 times as high as the comparative figure in 1975 ($155.23). This budget

Table 1
Mean Expenditure Per Pupil in Each Budget Area
(With Standard Deviations) 1975-1978

Budget Area	1975	1976	1977	1978	N=133
Ear. Child.	$15.32 ($23.16)	$17.45 ($21.73)	$19.23 ($28.08)	$21.17 ($31.44)	
Elementary	$787.44 ($175.21)	$897.17 ($190.80)	$1004.06 ($224.42)	$1193.47 ($845.34)	
Junior H.	$843.29 ($198.49)	$962.98 ($288.31)	$1100.99 ($441.11)	$1245.10 ($317.70)	
Senior H.	$1070.80 ($1603.93)	$1088.39 ($1520.91)	$1367.18 ($2672.01)	$1887.05 ($6959.29)	
Special Ed.	$32.72 ($50.98)	$39.45 ($33.77)	$50.66 ($40.14)	$62.57 ($48.44)	
Comm. Ser.	$4.07 ($10.86)	$10.49 ($49.04)	$9.23 ($40.14)	$8.38 ($20.56)	
Pupil Pers.	$11.05 ($17.08)	$11.70 ($20.35)	not reported		
Admin.	$95.11 ($123.54)	$95.30 ($38.41)	$108.18 ($42.62)	$122.46 ($47.78)	
Oper./Maint.	$155.23 ($57.17)	$178.81 ($73.77)	$206.93 ($85.13)	$235.17 ($85.75)	
Transport.	$109.21 ($117.08)	$121.06 ($126.34)	$125.12 ($135.72)	$146.52 ($151.71)	
Capital Out. & Debt Ser.	$144.71 ($88.65)	$143.86 ($91.09)	$167.14 ($102.99)	$181.18 ($108.50)	
Total Oper.	$1432.24 ($289.41)	$1604.84 ($324.17)	$1782.49 ($376.63)	$2007.91 ($364.53)	
Surplus*	$31.55 ($68.87)	$7.95 ($69.55)	$15.04 ($77.75)	$13.53 ($86.41)	
Total	$1474.96 ($295.09)	$1630.77 ($320.67)	$1815.22 ($372.95)	$2048.26 ($363.29)	

area appears to be rising more quickly than other budget areas such as Transport (with a 1978/1975 ratio of 1.34), Capital Outlay/Debt Services (with a 1978/1975 ratio of 1.25) or Administration (with a 1978/1975 ratio of 1.29).

Means and standard deviations were also calculated for the change in pro-rated enrolment between each of the years. Table 2 shows the results of these calculations. Notice that while mean elementary enrolment changes have gone from decline to increase (negative to positive), junior high mean enrolment changes have gone in the other direction. Senior high mean enrolment changes have gone from a high increase to lower levels of increase. These comparisons agree with the ideas of "population waves" (and troughs) which show declines moving through the grade levels from elementary to senior high grades (see chapter 2). This would also indicate that by 1978, declining enrolments had moved into the junior high level but that they had perhaps not yet reached the senior high level.

G. Analysis of Subproblem 1

Subproblem 1 sought to establish the degree to which per pupil expenditures in each budget area are related to jurisdiction size or to enrolment change. This subproblem was investigated by calculating correlation coefficients in three ways:

Table 2
Mean Pro-rated Enrolment Change
(With Standard Deviations)

	1976-75*	1977-76	1978-77	N
Elementary	-13.14** (126.11)	-6.05 (133.40)	2.02 (96.88)	133
Junior H.	6.97 (57.30)	-4.74 (76.62)	-20.91 (112.95)	133
Senior H.	32.00 (114.30)	7.71 (80.73)	14.26 (89.84)	103
All Grades	24.38 (144.66)	4.35 (215.89)	-13.69 (257.67)	133

*The latter year's enrolment minus the previous year.

**A negative change in enrolment indicates a decline.

1. Correlation between pro-rated enrolment and expenditure per pupil.
2. Correlation between changes in pro-rated enrolment and the expenditures per pupil.
3. Correlation between changes in pro-rated enrolment and changes in per pupil expenditures.

Table 3 contains the coefficients and probabilities showing correlations between jurisdiction size and expenditure per pupil. Elementary, Junior High and Senior High Expenditures are correlated with the elementary, junior high and senior high enrolments. All other budget areas were correlated with the total enrolments as a measure of size.

The probabilities (in brackets) on Table 3 indicate that there are only six correlation coeficients which may be considered significant at an alpha level of .05. This can be interpreted to mean that in the budget areas, Community Services, Pupil Personnel and Administration there is a significant but 'slight' (because the correlation is low) relationship between expenditure per pupil and jurisdiction size.

In Community Services a correlation occured in only the first of the four years. This correlation (.1701) indicates that less than 3 percent (.1701 squared) of the variance in expenditure per pupil is accounted for by this relationship with jurisdiction size. For these reasons the single significant finding in Community Services is not considered important.

Table 3
Correlation Coefficients
Jurisdiction Size with Expenditure Per Pupil
(With Probabilities Included)

Budget Area	1975	1976	1977	1978	N
Ear. Child.	.0245	.0587	.0645	.0601	133
	(.780)	(.502)	(.461)	(.492)	
Elementary	.1150	.1097	.1589	.0022	131
	(.191)	(.212)	(.070)	(.980)	
Junior H.	.0421	-.0093	-.0022	-.0333	130
	(.634)	(.917)	(.980)	(.707)	
Senior H.	-.0761	-.0622	-.0608	-.0497	100
	(.451)	(.534)	(.542)	(.618)	
Special Ed.	.0776	.1448	.1386	.1239	133
	(.375)	(.096)	(.112)	(.155)	
Comm. Ser.	* .1701	.0237	.0395	.1452	133
	(.050)	(.786)	(.651)	(.095)	
Pupil Pers.	* .4073	* .4029	not reported		133
	(.000)	(.000)			
Admin.	-.0908	*-.2125	*-.2207	*-.2141	133
	(.299)	(.014)	(.011)	(.013)	
Oper./Maint.	-.0891	.0893	.0924	.0981	133
	(.308)	(.307)	(.290)	(.261)	
Transport.	-.0951	-.0899	-.0809	-.0903	133
	(.276)	(.303)	(.354)	(.301)	
Capital Out. & Debt Ser.	.0316	.0215	.0022	.0063	133
	(.718)	(.806)	(.980)	(.943)	
Total Oper.	.0396	.0315	.0351	.0139	133
	(.651)	(.718)	(.688)	(.874)	
Surplus	-.0945	-.0179	-.0134	-.0006	133
	(.279)	(.838)	(.878)	(.994)	
Total	.0131	.0171	.0259	.0026	133
	(.881)	(.845)	(.768)	(.994)	

(Probabilities on a two-tailed test of significance)

Pupil Personnel had a significant correlation of about .4000 in the two years calculated. This indicates that the jurisdiction size was related to about 16 percent (.4000 squared) of the variance in expenditure per pupil in this budget area. Pupil personnel expenditures, however, are no longer reported as a separate budget area, therefore this finding cannot be considered to have future importance.

Administration expenditures per pupil were found to have a significant negative correlation with total pro-rated enrolments. In other words, larger jurisdictions had lower administration costs and visa versa. This correlation accounted for less than 5 percent (-.21 squared) of the variance in expenditure per pupil in Administration.

Significant correlations between expenditure per pupil and pro-rated enrolments were not found in any of the other budget areas.

Table 4 shows the correlation coeficients and probabilities found when comparing change in enrolments and the per pupil expenditures of each budget area. Significant correlations were found in a different group of budget areas than those shown as significant of table 3. Table 4 indicates significant correlations in Junior High Instruction, Senior High Instruction and in Capital Outlay and Debt Services.

The budget areas; Junior High Instruction, and Senior High Instruction indicate significant correlations between expenditure per pupil and the change in enrolment between

Table 4
Correlation Coefficients
Change in Pro-Rated Enrolments with Expenditure per Pupil
(With Probabilities Included)

Budget Area	1976-75	1977-76	1978-77	N
Ear. Child.	-.0213 (.808)	-.0324 (.712)	-.0321 (.714)	133
Elementary	-.0590 (.500)	-.0799 (.360)	.0205 (.815)	133
Junior H.	-.1224 (.160)	* -.2673 (.002)	-.0262 (.765)	133
Senior H.	-.0752 (.452)	* -.2728 (.005)	-.0200 (.840)	104
Special Ed.	-.0906 (.299)	-.1243 (.154)	-.0874 (.317)	133
Comm. Ser.	-.0172 (.845)	-.0529 (.545)	-.1365 (.117)	133
Pupil Pers.	-.0380 (.664)	not reported		133
Admin.	-.1313 (.132)	.0089 (.919)	.0411 (.639)	133
Oper./Maint.	-.0232 (.791)	-.0590 (.500)	-.0692 (.429)	133
Transport.	-.0339 (.698)	.0402 (.646)	.0336 (.701)	133
Capital Out. & Debt Ser.	* .1737 (.046)	.1662 (.056)	* .2038 (.019)	133
Total Oper.	-.0194 (.824)	-.0321 (.861)	-.0157 (.078)	133
Surplus*	.0152 (.862)	.0153 (.861)	-.1536 (.078)	133
Total	-.0258 (.768)	-.0234 (.789)	-.0277 (.752)	133

(Probabilities on a two-tailed test of significance)

1976 and 1977. These correlations occurred during no other periods. This raises the question as to why such a correlation exists in only this one time period and in only these two budget areas? There no simple explanation for this result. Because of the single occurance of a significant coefficient for both budget areas, no further importance will be attached to these findings in this thesis.

Of more importance is the relationship between expenditure per pupil and change in pro-rated enrolments in the budget are of Capital Outlay and Debt Services. Significant correlations were found indicating that less than 3 percent (.17 squared) of the variance in expenditures per pupil in the area of Capital Outlay could be related to change in enrolment.

Table 5 shows the correlation coefficients and probabilities found when comparing the change in expenditure per pupil (rather than total expenditure per pupil as in Table 4) with the change in pro-rated enrolments. This table shows that only three coefficients were found to be significant at an alpha level of .05. These three areas were the same ones as found in Table 4 above, ie. Junior and Senior High Instruction and Capital Outlay and Debt Services. Extending the correlation calculations to include correlations between changes in expenditure per pupil did not bring important new information.

In conclusion, investigations into the relationships questioned in subproblem 1 resulted in identifying certain

Table 5
Correlation Coefficients
Change in Pro-Rated Enrolments with Change in Expenditure per Pupil
(With Probabilities Included)

Budget Area	1976-75	1977-76	1978-77	N
Ear. Child.	-.0276 (.753)	-.0228 (.795)	-.0303 (.730)	133
Elementary	-.0651 (.456)	-.0731 (.403)	.0022 (.980)	133
Junior H.	-.1187 (.174)	* -.3111 (.000)	-.0787 (.448)	133
Senior H.	-.0098 (.922)	* -.3035 (.002)	-.0752 (.448)	104
Special Ed.	-.0085 (.923)	-.0839 (.337)	-.0017 (.984)	133
Comm. Ser.	-.0174 (.842)	-.0077 (.930)	-.0255 (.771)	133
Pupil Pers.	-.0164 (.851)	not reported		133
Admin.	-.0016 (.851)	.0249 (.776)	.0155 (.860)	133
Oper./Maint.	-.0699 (.424)	-.0099 (.910)	-.0211 (.809)	133
Transport.	-.0977 (.263)	-.0240 (.784)	-.0274 (.754)	133
Capital Out. & Debt Ser.	* .1783 (.040)	.1047 (.230)	.1077 (.217)	133
Total Oper.	-.0336 (.701)	-.0188 (.830)	-.0112 (.898)	133
Surplus*	.0680 (.437)	.0086 (.922)	-.1391 (.110)	133
Total	-.0185 (.832)	-.0088 (.920)	-.0200 (.820)	133

(Probabilities on a two-tailed test of significance)

budget areas which show significant correlations between expenditures and jurisdiction size and between expenditures and enrolments. It was found that while Community Services, Pupil Personnel and Administration may be related to jurisdiction size they did not show any correlation with the change in pro-rated enrolments. Inversely, it was found that Capital Outlay expenditures per pupil were related to the changes in pro-rated enrolments but did not show correlations with jurisdiction size. No new significant correlations were found when change in expenditure per pupil was compared with change in pro-rated enrolments. Another finding in this portion of the investigation was that, except for the budget area Pupil Personnel, jurisdiction size and enrolment changes each accounted for less than 5 percent of the variance in per pupil expenditures in those areas which indicated any significant relationships.

H. Analysis of Subproblem 2

Subproblem 2 asks if there are differences among size groups and among enrolment change groups or if there is an interaction between the size of the jurisdiction and enrolment change which might affect variations in per pupil expenditures in each budget area.

Analysis by Jurisdiction Size

The one way analysis of variance test (Nie, et. al.:1975) was used to discover if there were differences

among the means of jursidiction size groups in each of the budget areas over each of the four years of the study. The jurisdictions which make up each group are shown in Appendix I. The means of each group may be found in Appendix II.

Table 6 shows the F-ratios and the probabilities of those F-ratios for each budget area and year analyzed. There are seven budget areas which contain F-ratios which could be expected to occur at an alpha level of .05 (probability below .05). These are:

1. Senior High School Instruction.
2. Pupil Personnel.
3. Administration.
4. Operation and Maintenance.
5. Transportation.
6. Total Operational Expenditures.
7. Total Expenditures.

Two way ANOVA with Repeated Measure by Jurisdiction Size

As a check on the findings of the one way analysis of variance tests it was decided that a different analysis of variance test be used (DERS, "ANOVA 26, Repeated Measures"). In this test the year that the expenditure per pupil occurred became the second independent variable. Thus a test with repeated measures was introduced. In other words, it became an analysis of variance test with a repeated measure. Each budget area was investigated. Table 7 shows the

Table 6
F-ratios and probabilities for One Way Analysis of Variance of Expenditures per pupil in Eleven Groups of Alberta School Jurisdictions (Appendix II for means)

Budget Area	1975	1976	1977	1978
Ear. Child.	1.283 (.2471)	1.506 (.1452)	1.317 (.2288)	1.343 (.2155)
Elementary	1.496 (.1486)	1.504 (.1456)	1.439 (.1711)	1.331 (.2214)
Junior H.	.729 (.6956)	.950 (.4904)	.902 (.5338)	1.915 (.0491)
Senior H.	* 3.081 (.0061)	* 3.280 (.0009)	1.637 (.1040)	.845 (.5862)
Special Ed.	.341 (.9680)	1.414 (.1818)	1.306 (.2349)	1.081 (.3823)
Comm. Ser.	1.746 (.0778)	.749 (.6775)	.775 (.6525)	.751 (.6752)
Pupil Pers.	* 6.285 (.0000)	* 6.149 (.0000)	not reported	
Admin.	.957 (.4690)	* 3.186 (.0012)	* 3.476 (.0005)	* 3.566 (.0004)
Oper./Maint.	* 2.809 (.0036)	* 2.383 (.0129)	1.641 (.1026)	* 4.093 (.0001)
Transport.	* 2.597 (.0068)	* 2.761 (.0042)	* 2.656 (.0057)	* 2.617 (.0064)
Capital Out. & Debt Ser.	.701 (.7222)	.647 (.7710)	1.003 (.4445)	1.195 (.3010)
Total Oper.	* 1.912 (.0496)	* 2.094 (.0298)	1.464 (.1608)	* 2.503 (.0090)
Surplus*	* 2.273 (.0178)	.565 (.8395)	.235 (.9922)	.949 (.4918)
Total	1.912 (.0496)	2.094 (.0298)	1.464 (.1608)	2.503 (.0090)

* Asterisk indicates a noteworthy finding.

Table 7
F-ratios and Probabilities for Two Way ANOVA (Repeated Measures over Four Years) on Expenditures per Pupil in Eleven Size Groupings of Alberta Jurisdictions (Appendix II for means)

Budget Area	Effects of size	Effects of Year	Interaction Size and Year
Ear. Child.	1.376 (.2061)	3.615 (.0134)	1.055 (.3925)
Elementary	* 1.961 (.0495)	20.012 (.0000)	.999 (.4682)
Junior H.	1.171 (.3195)	65.747 (.0000)	.728 (.8393)
Senior H.	1.375 (.2065)	1.473 (.2214)	.582 (.9545)
Special Ed.	1.254 (.2687)	27.080 (.0000)	.931 (.5670)
Comm. Ser.	.662 (.7420)	1.597 (.1898)	.802 (.7500)
Pupil Pers.	13.170 (.0000)	78.300 (.0000)	not reported
Admin.	* 2.742 (.0059)	6.216 (.0004)	.635 (.9231)
Oper./Maint.	* 2.962 (.0032)	112.625 (.0000)	1.440 (.0747)
Transport.	* 2.909 (.0037)	36.971 (.0000)	1.279 (.1626)
Capital Out. & Debt Ser.	.905 (.5230)	12.849 (.0000)	.565 (.9627)
Total Oper.	* 2.275 (.0214)	350.566 (.0000)	.642 (.9178)
Surplus	.547 (.8372)	2.358 (.0713)	.998 (.4701)
Total	* 2.138 (.0310)	360.753 (.0000)	.661 (.9034)

* Asterisk indicates a noteworthy finding.

resulting F-ratios and probabilities.

The first column shows F-ratios for differences among size groupings. The second column shows F-ratios for differences among the years (i.e. the repeated measure). The third column shows F-ratios for the interaction effects between size groupings and years.

Almost every F-ratio in the second column has a probability of less than .05 (ie., significant at alpha level of .05). This was expected. Inflation would naturally make the per pupil expenditures of jurisdictions significantly different in each year of the test.

The third column, representing interation effects between size and year, does not provide enlightening information. An interaction between size of jurisdiction and year would prove to be interesting if for no other reason than it would be very difficult to explain. However, no significant F-ratios, indicating an interaction of size and year, were found.

The first column of table 7 contains those F-ratios which are significant to this study. Significant F-ratios were found in the following budget areas:

1. Elementary Instruction
2. Pupil Personnel
3. Administration
4. Operational Expenditures
5. Total Expenditures

This indicates that by adding the strength of a "repeated

measures test" to our previous investigations, similar results confirmed (except in the two cases described below) the results of the earlier test.

Two differences are found between the findings of the one-way analysis of variance test and the findings of the two way ANOVA with repeated measures. The first is that Senior High Instruction is not found to be significant under the repeated measures test. This is explainable in that Senior High instruction was found to have no significantly different size groups in the one-way ANOVA tests for 1977 and 1978. The repeated measures test would therefore find that a significant difference between size groupings, over all four years, did not exist. The second incongruity between results of the two methods of testing was that under the repeated measures test, the budget area "Elementary Education" indicates a significant difference among the size groupings of jurisdictions. This was not expected and cannot be explained by this writer. As will be shown later in this chapter, this finding is an anomaly.

In summary, two types of analysis have been performed on the expenditure per pupil data in each budget area:

1. One-way Analysis of Variance (Nie, et. al. "SPSS-One-way", 1975) in each year.
    a. independent variable
        1) size groupings
    b. dependent variable
        1) expenditure per pupil.

2. Two way Analysis of variance for repeated measures.(D.E.R.S "ANOVA 26, Repeated Measures", 1979)
    a. Independent variables.
        1) size groupings
        2) year of measure
    b. dependent variable
        1) expenditure per pupil

The results of both of these tests indicate a significant difference (with respect to expenditure per pupil) among size groupings of Alberta jurisdictions in the following budget areas:

1. Pupil Personnel
2. Administration
3. Operations and Maintenance
4. Transportation
5. Total Operational Expenditures
6. Total Expenditures

Of the above, two were found to not be useful in adding new information: Pupil Personnel, because this budget area ceased to be reported in 1977 and Total Expenditures, because this area is practicaly a repeat of the budget area Total Operational Expenditures.

<u>One Way Analysis by Percent Enrolment Change</u>

After first analyzing the cost per pupil data according to jurisdiction size groups in the ways already discussed,

the second step, towards investigating Subproblem 2, was to analyze the jurisdictions in groups based on change in enrolment. All Alberta jurisdictions were therefore separated into three groups:

1. declining enrolment jurisditions (dropping by more than 1% in a given year).
2. no change jurisdictions (ie., having between -1 and +1 percent change).
3. increasing enrolment jurisdictions (growing by greater than 1% in a given year).

A one way analysis of variance test was then performed on each budget area of each year.

For the budget areas: elementary, junior high and senior high instruction, elementary, junior high and senior high enrolments respectively were used to obtain enrolment change data. For all other budget areas, total enrolment figures were used. Jurisdictions having no enrolment for one of the above budget areas were excluded from the analysis. For example, a jurisdiction having no senior high students was excluded from the analysis of that budget area.

Differences between decreasing, no change and increasing enrolment groups were looked for. Table 8 indicates the f-ratio and probabilities that were found.

The only budget area with consistently significant F-ratios (ie., probabilities below .05) was Capital Outlay/Debt Services. This significant finding indicates that there is a difference between declining, stable and

Table 8
F-ratios and Probabilities for One Way
Analysis of Variance on Expenditures per Pupil
in Three Enrolment Change Groups.
(Appendix II for means)

Budget Area	1976	1977	1978
Ear. Child.	1.836 (.1636)	.296 (.7441)	1.308 (.2740)
Elementary	.042 (.9588)	.723 (.4871)	.381 (.6838)
Junior H.	* 4.858 (.0092)	.963 (.3846)	.697 (.4999)
Senior H.	1.051 (.3529)	.096 (.9085)	.135 (.8740)
Special Ed.	.470 (.6262)	.371 (.6905)	.415 (.6615)
Comm. Ser.	1.236 (.2940)	.390 (.6779)	.733 (.4823)
Pupil Pers.	1.464 (.2351)	not reported	
Admin.	.940 (.3932)	.491 (.6130)	.935 (.3953)
Oper./Maint.	2.230 (.1117)	1.254 (.2887)	2.204 (.1145)
Transport.	1.123 (.3284)	* 3.078 (.0494)	* 3.777 (.0254)
Capital Out. & Debt Ser.	* 3.410 (.0360)	* 4.661 (.0111)	* 5.585 (.0047)
Total Oper.	2.503 (.0858)	.999 (.3711)	2.668 (.0732)
Surplus	1.008 (.3677)	1.397 (.2511)	.459 (.6327)
Total	* 2.598 (.0783)	1.104 (.3348)	* 3.390 (.0367)

* Asterisk indicates a noteworthy finding.

increasing enrolment jurisdictions with respect to expenditures per pupil in the budget area Capital Outlay/Debt Services. This finding confirms the results of the correlation tests as shown in Capital Outlay/Debt Services on Table 4. Exactly where these differences are and the degree of difference will be discussed later in this chapter.

Interaction of Size Groups and Enrolment Change Groups

The question posed in Subproblem 2 concerns the effect of interaction between size and enrolment change on the expenditures per pupil. Using a two-way analysis of variance test, (Nie, et.al., 1975:410) main effects of size and enrolment change as well as interaction effects were calculated for each budget area. The resulting F-ratio's are shown on tables 9, 10 and 11.

Table 9 shows the F-ratios and probabilities of the main effects of the jurisdiction size groups. This table shows roughly the same results as shown in tables 6 and 7, ie. that the budget areas Pupil Personnel, Administration, Operations and Maintenance, and Transportation have significant F-ratios. (See discussion on table 7 for further explanation.)

Table 10 shows the F-ratios and probabilities of the main effects of enrolment change groups. This table confirms the findings shown on table 8, ie. that the budget area Capital Outlay/Debt services has consistently significant

Table 9
F-ratios and Probabilities for Main Effects of Size Groupings on Expenditure per Pupil

Budget Area	1976	1977	1978
Ear. Child.	1.465 (.163)	1.421 (.182)	1.392 (.195)
Elementary	1.369 (.205)	1.284 (.249)	.204 (.298)
Junior H.	.851 (.581)	.689 (.732)	1.800 (.070)
Senior H.	* 3.225 (.001)	1.877 (.057)	1.179 (.313)
Special Ed.	1.494 (.152)	1.239 (.276)	1.038 (.418)
Comm. Ser.	.909 (.528)	.637 (.779)	.731 (.794)
Pupil Pers.	* 9.263 (.000)	not reported	
Admin.	* 2.845 (.004)	* 3.364 (.001)	* 3.490 (.001)
Oper./Maint.	* 2.016 (.039)	1.277 (.253)	* 3.789 (.000)
Transport.	* 2.687 (.006)	* 2.547 (.009)	* 2.302 (.018)
Capital Out. & Debt Ser.	.819 (.612)	.808 (.621)	1.191 (.306)
Total Oper.	1.754 (.079)	1.381 (.200)	* 2.068 (.034)
Surplus	.446 (.920)	.101 (1.000)	.947 (.495)
Total	1.628 (.109)	1.134 (.344)	* 2.156 (.027)

* Asterisk indicates a noteworthy finding.

Table 10
F-ratios and Probabilities for Main Effects of Enrolment ChangeGroups on Expenditure per Pupil

Budget Area	1976	1977	1978
Ear. Child.	1.919 (.152)	.414 (.662)	1.819 (.167)
Elementary	.014 (.986)	.588 (.557)	.431 (.651)
Junior H.	4.062 (.020)	.303 (.739)	.637 (.531)
Senior H.	.118 (.888)	.869 (.423)	1.540 (.219)
Special Ed.	.867 (.423)	.057 (.944)	.496 (.610)
Comm. Ser.	1.533 (.221)	.159 (.853)	.845 (.433)
Pupil Pers.	2.173 (.119)	not reported	
Admin.	.675 (.512)	.916 (.403)	1.354 (.263)
Oper./Maint.	.532 (.589)	.176 (.839)	1.244 (.293)
Transport.	1.036 (.358)	3.052 (.052)	2.137 (.123)
Capital Out. & Debt Ser.	* 3.566 (.032)	* 3.440 (.036)	* 5.274 (.007)
Total Oper.	1.487 (.231)	.145 (.865)	1.318 (.272)
Surplus	.605 (.548)	.621 (.539)	.532 (.589)
Total	1.381 (.256)	.252 (.778)	1.883 (.157)

* Asterisk indicates a noteworthy finding.

Table 11
F-ratios and Probabilities for Interaction of Enrolment Change Groups and Size Groups on Expenditure per Pupil

Budget Area	1976	1977	1978
Ear. Child.	.870	1.509	.632
	(.615)	(.102)	(.873)
Elementary	.549	.433	.370
	(.932)	(.980)	(.992)
Junior H.	1.213	.296	.666
	(.263)	(.998)	(.829)
Senior H.	1.865	1.429	1.426
	(.052)	(.143)	(.144)
Special Ed.	1.066	1.098	.681
	(.397)	(.365)	(.830)
Comm. Ser.	* 1.807	.193	.543
	(.034)	(1.000)	(.935)
Pupil Pers.	1.043	not reported	
	(.420)		
Admin.	1.216	.649	.725
	(.263)	(.852)	(.786)
Oper./Maint.	1.070	.414	.942
	(.393)	(.982)	(.535)
Transport.	.591	.606	1.134
	(.899)	(.888)	(.330)
Capital Out. & Debt Ser.	.516	.743	.632
	(.945)	(.759)	(.873)
Total Oper.	1.087	.280	.832
	(.376)	(.998)	(.665)
Surplus	.965	.226	.928
	(.505)	(1.000)	(.551)
Total	1.309	.249	.926
	(.162)	(.999)	(.553)

* Asterisk indicates a noteworthy finding.

F-ratios over the years of the study. (See discussion on Table 8 for further expanation.)

Table 11 shows the F-ratios and probabilities of interaction effects between jurisdiction size groupings and enrolment change groupings. The important fact to note from Table 11 is that only one F-ratio is significant. Community Services in 1976 indicates a significant F-ratio (ie. probability less than .05). This significant F-ratio is not repeated in 1977 or 1978. There were no other significant F-ratios. The conclusion of this writer therefore must be that the F-ratio of Community Services in 1976 is an anomaly. There were no significant interactions between jurisdiction size and enrolment change which affect the expenditures per pupil of jurisdictions in any given budget area.

Results of Removal of the Effects of Enrolment Change

There are two ways enrolment change can be measured:

1. the total amount of enrolment change.
2. the percentage enrolment change.

In an analysis of covariance test both of these measures were used as covariants to remove the effects of enrolment change. F-ratios in each budget area and in each year were determined for jurisdiction size groupings. It was found that the resulting F-ratios were exactly the same whether percent enrolment change or actual amount of enrolment change was used. This seemed somewhat surprising but logical

because essentially both measured the same enrolment changes.

Table 12 shows the F-ratios and probabilities using an analysis of covariance test with jurisdiction size groupings as the independent variable, expenditure per pupil as the dependent variable and enrolment change as the covariant. Occurence of a significant F-ratio in this test indicates that a difference exists in the expenditures per pupil among the eleven size groupings after the effects of enrolment change on those expenditures have been removed.

Significant F-ratios were found in all three years in only three of the fourteen budget areas:

1. Administration.
2. Operations and Maintenance.
3. Transportation.

Significant F-ratios were also found in Pupil Personnel (during the one year available), in Junior High Instruction (during 1978), in Total Operational Expenditures (during 1978) and finally in Total Expenditures (during 1978). However, these single year findings are not considered to be important because they do not indicate a trend.

A comparison of the findings shown on tables 6, 7 and 12 will be discussed later in this chapter. It is enough at this point to say that the results shown in tables 7 and 12 were similar to the results shown on table 6. The statistical tests used to find the results for the later two tables were modifications of that used for table 6. Each

Table 12
F-ratios and Probabilities Among Size Groupings with Respect to Expenditure Per Pupil After Removal of the effects of Enrolment Change

Budget Area	1976	1977	1978
Ear. Child.	1.436 (.173)	1.252 (.266)	1.390 (.193)
Elementary	1.000 (.447)	1.124 (.350)	1.361 (.207)
Junior H.	1.472 (.158)	.393 (.948)	*4.687 (.000)
Senior H.	1.608 (.117)	.752 (.699)	.424 (.931)
Special Ed.	1.392 (.192)	1.235 (.276)	1.012 (.437)
Comm. Ser.	.745 (.680)	.798 (.631)	.864 (.569)
Pupil Pers.	*6.083 (.000)	not reported	
Admin.	*2.988 (.002)	*3.359 (.001)	*3.474 (.000)
Oper./Maint.	*2.037 (.035)	1.746 (.078)	*3.938 (.000)
Transport.	*2.738 (.005)	*2.597 (.007)	*2.462 (.010)
Capital Out. & Debt Ser.	.612 (.801)	.697 (.726)	.905 (.531)
Total Oper.	*1.935 (.047)	1.704 (.087)	*2.356 (.041)
Surplus	.415 (.937)	.185 (.997)	.832 (.599)
Total	1.875 (.055)	1.439 (.171)	*2.388 (.013)

* Asterisk indicates a noteworthy finding.

modification added power to the final conclusions.

Conclusion to Analysis of Subproblem 2

A comparison of tables 6 through 12 is enlightening. Table 13 shows the budget areas affected in each of the ANOVA tests. A pattern emerges from the comparisons shown on this table.

Tables 6, 7, 9 and 12 tend to indicate similar results. Tables 8 and 10 could also be grouped together. Table 11, however, is unlike any of the other tables. Each of these groups of similar tables is discussed below.

EFFECTS OF SIZE

The following tables each showed results of an analysis of the effect of size on expenditures per pupil.

Table 6 - One-way ANOVA using Jurisdiction size groupings.

Table 7 - ANOVA for Repeated Measures - using size groupings over four years.

Table 9 - Two way ANOVA - Main effects of size groupings.

Table 12 - ANCOVA using size groupings while removing the effects of enrolment change.

These tables 'repeatedly' indicate significant F-ratios in six budget areas:

1. Pupil Personnel
2. Administration
3. Operations and Miantenance

Table 13

A Consolidation of Tables 6 to 12 Showing in Which Budget Area Significant F-Ratios were Found and the Number of Years That They Occured.

Table No.	6	7	8	9	10	11	12
Ear. Child.							
Elementary		*					
Junior H.					*		*
Senior H.	**			*			
Special Ed.							
Comm. Ser.						*	
Pupil Pers.	**	*		*			*
Admin.	**	*		***			***
Oper./Maint	***	*		**			**
Transport.	****	*	**	***			***
Cap. Out. & Debt Ser.			***		***		
Total Oper.	***	*		*			**
Surplus	*						
Total	***	*	*	*			*

* Asterisk indicates a noteworthy finding.

4. Transportation
5. Total Operational Expenditures
6. Total Expenditures

However, only three of these budget areas seem to have significant F-ratios in all three years analyzed across all four of the tables listed above. These are:

1. Administration
2. Operations and Maintenance
3. Transportation

Consistent results in these budget areas would seem to indicate a difference in the expenditures per pupil which is related to the size of the jurisdictions. A discussion of exactly where these differences may lie is found later in this chapter.

Less consistent are the significant F-ratios found in the areas of Total Operational Expenditures and Total Expenditures. Significant F-ratios only in some years indicate that Total Operational Expenditures and Total Expenditures may or may not have differences in the per pupil expenditures which are dependent upon the size of school jurisdictions. It is logical that any differences in Administration, Operations and Maintenance and Transportation would cause differences in these two areas. The test with repeated measures (table 7) which is the most powerful of the tests used indicates that differences do exist.

The significant F-ratios found in the budget area Pupil

Personnel were highly significant in the first year of the study and thus indicate that before it was taken out of the reporting system, the expenditures per pupil in this budget area were highly related to the size of school jurisdictions. However, since this budget area was discontinued from the reporting system of Alberta jurisdictions in 1977 no further investigation appears to be profitable here.

Finally it is of value to compare the results of table 12 with tables 6 and 7. Tables 6 and 7 show the F-ratios which result from an analysis of the per pupil expenditures among eleven jurisdiction groupings. Table 12 shows the same analysis when the effects of enrolment change are removed (as a covariant). The question which must be asked in comparing these two tables is "Do these tables differ in their corresponding F-ratios? In other words, when the effects of enrolment change are removed (as a covariant), are new significant results found? Since the results are the same (as can be seen from Table 14) this writer tends toward the conclusion that enrolment change has an almost negligible effect on expenditures per pupil.

EFFECTS OF ENROLMENT CHANGE

The second group of tables indicates significant F-ratios found when analyzing the effect of enrolment change on expenditures per pupil. The tables are:

Table 8 - One way ANOVA - using increasing stable and decreasing enrolments as groups.

Table 14
A Comparison of F-rations From Three Budget Areas on Table 6 and Table 12.

	table 6	table 12
	1976	
Admin.	3.186	2.988
Oper./Maint.	2.383	2.037
Transport.	2.761	2.737
	1977	
Admin.	3.476	3.359
Oper./Maint.	1.641	1.746
Transport.	2.656	2.597
	1978	
Admin.	3.566	3.474
Oper./Maint.	4.093	4.142
Transport.	2.617	2.462

Table 10 - Two way ANOVA - Main effects of enrolment change groups.

The budget area Capital Outlay and Debt Services was the only budget area showing significant F-ratios on both tables across all three years of this test. The conclusion of this author, therefore, is that there is a significant difference, with respect to expenditure per pupil, between jurisdictions with declining enrolments, stable enrolments and increasing enrolments only in the budget area 'Capital Outlay and Debt Services'.

INTERACTION EFFECTS

The third grouping, which can be drawn from the comparisons on table 13, regards the interaction effects of enrolment change and size. Only one significant F-ratio was found and it is believed to have happened by chance occurrance. During the year 1976 an interaction effect between enrolment change and jurisdiction size was found in the area of Community Services. It is the author's opinion that there is no value for future speculation from this single result. The conclusion therefore must be that there appears to be no interaction between the direction of enrolment change, (i.e., increase, stable or decrease) and the size of a jurisdiction.

The Student-Newman-Keuls Test

Using the Student-Newman-Keuls procedure for an "a posteriori contrast" test (Nie, Hull, Jenkins, Steinbrunner

and Bent, 1975:428) each of the four budget areas which were effected by jurisdiction size or enrolment change was investigated to discover which groups could be considered to be significantly different. Appendix I may be used by the reader to obtain a complete listing of jurisdictions grouped by size. Appendix II may be used to obtain group means for all jurisdiction groupings analyzed for 1976, 1977 AND 1978.

Administration. Group 4 differed significantly from groups 7, 9, 10, and 11. Table 15 shows a comparison of group 4 with groups 7 through 11. Administrative expenditures per pupil in each year are over 50 percent higher in group 4 than in the jurisdictions with over 1800 students. No obvious explanation is available.

Operations and Maintenance. Group 1 was identified as being significantly different from group 3. Table 16 shows that jurisdictions in size group 3 tend to spend almost half as much as those in group 1. Again there is no obvious reason for this.

Transportation. The Student-Newman-Keuls test could not identify which groups significantly differed, with respect to per pupil expenditures for transportation, in spite of the fact that significant F-ratios were found in all tests. Investigation of the means indicated that there may be a curvilinear relationship between the enrolment of a jurisdiction and its expenditure per pupil in the area of transportation.

The Statistical Package for the Social Sciences (SPSS)

Table 15
Mean Expenditures Per Pupil in "Administration" by Differing Enrolment Groups

Group	Enrolment Range	Mean Expenditure Per Pupil		
		1976	1977	1978
4	501- 799	$127.55	$148.92	$160.08
7	1816- 2283	$82.00	$91.63	$101.56
8*	2380- 3090	$87.46	$91.62	$108.08
9	3239- 4641	$76.27	$85.82	$98.36
10	5191- 8901	$70.71	$79.71	$80.57
11	12461-81243	$61.60	$70.80	$80.60

*Group 8 was not found to be significantly different from group 4. It is included in this table to give continuity between groups 7 and 11.

Table 16
Mean Expenditures Per Pupil in "Operations and Maintenance" by Differing Enrolment Groups

Group	Enrolment Range	Mean Expenditure Per Pupil		
		1976	1977	1978
1	19-154	$226.50	$222.50	$293.50
3	339-487	$121.46	$147.54	$152.62

contains a program for determining quadratic (curvilinear) relationships. This test was applied. The F-ratio for a linear fit was found to be .094 with a probability of .7597. Thus the result for a linear fit was not significant. The F-ratio for a quadratic fit was 7.465 with a probability of .0072. This would seem to indicate that there is a definite quadratic curvilinear relationship between the size of a jurisdiction and the expenditure per pupil on transportation. Table 17 shows the actual mean expenditures per pupil for transportation. The above suggestion of a curvilinear relationship seems acceptable upon an examination of Table 17. The expenditure per pupil rises with the size of jurisdiction until group 8, after which the expenditure per pupil declines as the size of the group increases. This is thought to be a significant discovery.

Capital Outlay and Debt Services. The group of declining enrolment jurisdictions was found to be significantly different from the group of increasing enrolment jurisdictions. Table 18 shows that the mean expenditure per pupil for Capital Outlay and Debt Services is significantly higher for jurisdictions with increasing enrolments. It was expected that jurisdictions which are declining would be building less schools and providing less services which require capital expenditures.

Table 17
Mean Expenditures Per Pupil in "Transportation"
by Differing Enrolment Groups

Group	Enrolment Range	Mean Expenditure Per Pupil		
		1976	1977	1978
1	19- 154	$124.64	$110.79	$167.07
2	193- 292	$26.53	$28.87	$37.07
3	339- 487	$34.38	$38.69	$43.85
4	501- 799	$180.18	$168.17	$185.33
5	895- 1171	$171.45	$191.09	$214.45
6	1314- 1780	$145.50	$149.06	$179.19
7	1816- 2283	$161.31	$173.94	$194.81
8*	2380- 3090	$173.77	$185.15	$205.85
9	3239- 4641	$131.36	$133.55	$151.64
10	5191- 8901	$98.00	$105.57	$116.86
11	12461-81243	$44.60	$50.20	$58.20

Table 18
Mean Expenditures Per Pupil for
Capital Outlay/Debt Services
by Enrolment Change Groups

Group	Mean Expenditure Per Pupil		
	1976	1977	1978
declining enrolments	$130.29	$133.43	$149.53
increasing enrolments	$165.24	$196.36	$215.50

I. Analysis of Subproblem 3

Do changes in expenditures lag changes in enrolment? In this portion of the study an analysis of covariance test was conducted using the percent enrolment change of the previous year as a covariant. The resulting F-ratios and probabilities are shown in table 19.

The budget areas, Administration, Operations and Maintenance and Transportation show significant F-ratios in both of the years which could be analyzed. Significant results were also found in one year in the budget areas Junior High Instruction, Total Operational Expenditures and Total Expenditures. Similar results appeared on table 12 which removed the effects of enrolment change for the same year as that in which the expenditures occurred. F-ratios did not increase dramatically with the lag of one year of the covariant except in the budget area Operations and Maintenance.

It was thought that by removing the effects of enrolment change as they were two years previous to the year in which the expenditures occurred (i.e., a lag of two years) new information might be gained. Table 20 indicates the resulting F-ratios and probabilities in the one year that could be thus analyzed. There were no new significant results. F-ratios did rise slightly in most budget areas but as in the one year lag, only the F-rato in Operations and Maintenance seemed to be much higher than on the same test with no adjustment for a lag in the effects of enrolment

Table 19
F-ratios and Probabilities Indicating a Difference Among Size Groups With Respect to Expenditure Per Pupil-After Removal of Effects of Previous Years Enrolment Change.

Budget Area	1977	1978
Ear. Child.	1.299 (.239)	1.310 (.233)
Elementary	1.236 (.276)	1.186 (.307)
Junior H.	1.123 (.351)	*3.376 (.001)
Senior H.	.597 (.892)	.514 (.876)
Special Ed.	1.287 (.245)	.992 (.454)
Comm. Ser.	.775 (.652)	.939 (.500)
Pupil Pers.	not reported	not reported
Admin.	*3.277 (.001)	*3.487 (.000)
Oper./Maint.	*1.442 (.170)	*3.835 (.000)
Transport.	*2.712 (.005)	*2.399 (.012)
Capital Out. & Debt Ser.	.726 (.698)	.787 (.641)
Total Oper.	1.728 (.082)	*2.141 (.026)
Surplus	.069 (1.000)	1.091 (.375)
Total	1.414 (.182)	*2.152 (.025)

* Asterisk indicates a noteworthy finding.

Table 20
F-ratios and Probabilities For Size Groups with Respect to Expenditure Per Pupil After Removal of Effects of Enrolment Change (2 Years Previous)

Budget Area	1978 (Covariate 1976-75)
Ear. Child.	1.375 (.200)
Elementary	.767 (.660)
Junior H.	*4.362 (.000)
Senior H.	.555 (.864)
Special Ed.	.910 (.526)
Comm. Ser.	.778 (.650)
Pupil Pers.	not reported
Admin.	*3.521 (.000)
Oper./Maint.	*3.702 (.000)
Transport.	*2.527 (.008)
Capital Out. & Debt Ser.	.849 (.583)
Total Oper.	*2.149 (.026)
Surplus	1.010 (.439)
Total	*2.221 (.021)

* Asterisk indicates a noteworthy finding.

change. This may indicate that enrolment change of previous years may slightly effect the differences in expenditures per pupil among school jurisdictions in the budget area Operations and Maintenance. However the evidence is not conclusive here. This may be a good area for future study.

V. FINDINGS AND CONCLUSIONS

In this chapter the general findings of this study will be discussed. General information on pro-rated enrolments and expenditures per pupil will be discussed first. Following this, each budget area will be discussed separately to indicate how jurisdiction size and enrolment change effect expenditures in that area.

A. Pro-rated Enrolment in Alberta

The pro-rated enrolment counts among Alberta jurisdictions in 1978 ranged from 19 pupils in Waterton to 81,243 pupils in Calgary Public School District. The distribution of students within this range was not comparable to a normal bell curve. For example, approximately 207,000 of the 420,000 students in 1978 resided in the largest four jurisdictions, i.e., Calgary Public, Calgary Separate, Edmonton Public, Edmonton Separate and County of Strathcona. Appendix I shows the pro-rated enrolments for all jurisdictions studied in this thesis.

B. Expenditure per Pupil in Alberta

In 1976 the mean total expenditure per pupil was $1631. The range of these expenditures was from $1223 in Ponoka Roman Catholic Separate School District to $3067 in Berry Creek School Division. In 1977 the mean total expenditure per pupil was $1815. The range was from $1422 to $3417 between the same two jurisdictions. In 1978, again between

the same two jurisdictions, Berry Creek and Ponoka, the range was from $3781 to $1422. The distribution·of expenditures per pupil between the extremes in each year approximated a normal bell curve.

The five big jurisdictions because they have approximately fifty percent of the students in Alberta have been shown on Table 21.

The means for each of the jurisdiction size groupings and for each of the enrolment change groups, in each of the three years which could be analyzed by ANOVA methods, are given in Appendix II. The means are grouped by budget area and are rounded to the nearest whole dollar.

C. Early Childhood Services

There was found to be no relationship between the expenditures in the budget area Early Childhood Services and total (grades one to twelve) enrolment. In other words, the size of the jurisdiction was not found to be a factor in influencing expenditures for pre-grade one education.

Also no relationship was found between changing enrolments (grades one to twelve) and expenditures in the budget area Early Childhood Services. More specifically, it was not found that declining enrolments effected the expenditures in this budget area or that increasing enrolment jurisdictions significantly differed from decreasing enrolment jurisdictions in the amount they spent per pupil.

Table 21
Mean total expenditures (in dollars) per pro-rated pupil of the largest five School Jurisdictions of Alberta.

Jurisdiction	1976	1977	1978
Edmonton Public	$1735	$1960	$2178
Calgary Public	$1648	$1826	$2032
Calgary Separate	$1593	$1738	$1908
Edmonton Separate	$1677	$1841	$2028
County of Strathcona	$1564	$1831	$2004

D. Elementary Instruction

A general increase in the mean expenditure per pupil was found over the four years of this study (See table 1). The mean elementary expenditures per pupil were:

1975 - $ 787

1976 - $ 897

1977 - $1004

1978 - $1193

The mean pro-rated elementary enrolment change between each of the four years indicated a changing trend from a decrease to increase.(see table 2)

1975-76...-13.14 students

1976-77...- 6.05 students

1977-78...+ 2.02 students

These enrolment findings are consistent with the findings of Alberta Education (1978:8) shown in chapter 2. They predicted elementary enrolments would begin to increase in 1978.

No significant relationships were found in the budget area Elementary Instruction between:

1. Expenditure per pupil and total jurisdiction enrolment (Table 3)
2. Expenditure per pupil and change in jurisdiction enrolment (table 4)
3. Change in Expenditure per pupil and change in jurisdiction enrolment (table 5)

Significant differences between expenditures per pupil were looked for. Tests for differences by jurisdiction size group generally indicated that there were no significant differences among the eleven groups. Tests for differences among declining, stable or increasing enrolment groups found no significant F-ratios which would indicate a significant difference among groups. No interaction effects were found between size groupings and enrolment change groupings which significantly effected the expenditures per pupil in this budget area.

Tests to discover if there was a lag in the effects of enrolment change were carried out. These tests found no significant F-ratios to indicate a difference among size groupings when the effects of two previous enrolment changes had been removed.

The conclusion of this study therefore is that per pupil expenditures in this budget area were not significantly affected by enrolment size or change.

E. Junior High Instruction

The mean expenditure per pupil in this budget area was also found to increase over the four years studies (see table 1). The mean expenditures per pupil were:

1975 - $ 843
1976 - $ 962
1977 - $1100
1978 - $1245

It must be noted that the mean expenditure per pupil for the budget area, Junior High Instruction, was slightly higher in each of the years than the corresponding figures for Elementary Instruction.

The men pro-rated enrolment change for junior high schools indicated a changing trend from an increase of 6.97 students between1975 and 1976 to a decrease of 20.91 students between 1977 and 1978 (see table 2). This finding was also consistent with the enrolment projections of Alberta Education as given in chapter 2.

A significant correlation was found between the expenditure per pupil and change in jurisdiction enrolment between 1976 and 1977. The correlation coefficient was -.2673 with a probability of .002 (see table 4). This same period indicated a significant correlation of -.3111 with a probability of .000 when change in expenditure per pupil was correlated with change in enrolments (table 5). However, these significant relationships were found in only one of the three possible years, therefore, although they are

worthy of note, they are not of lasting importance.

Significant differences in expenditures per pupil were looked for among two kinds of groupings: size groups and enrolment change groups. Two significant F-ratios were found on the seven ANOVA tests performed (see table 13). These were considered to have happened by chance. Generally, findings indicated that there were no significant differences among size groups or enrolment change groups. No interaction effects (table 11) were found between size and enrolment change in this budget area.

Tests to find the effects of changes in enrolment from previous years were inconclusive. Expenditures per pupil among size groups in 1978 were found to have significant F-ratios when the effects of the previous year's enrolment change were removed (table 19). However the same test for 1977 did not have significant results. The 1978 expenditure differences were found to be even more significant when the effects of enrolment change from two years previous were removed (table 20). This lack of consistency between years prevents any conclusions about a lag in the effects of enrolment change.

A general conclusion of this study, therefore, is that jurisdiction expenditures per pupil on Junior High Instruction were not found to be affected by total enrolment or enrolment change.

F. Senior High Instruction

The mean expenditure per pupil in this budget area increased during the years studied (see table 1). The mean expenditures were:

1975 - $1071

1976 - $1088

1977 - $1367

1978 - $1887

The mean enrolment change revealed continued increases through all three years of the study (see table 2). This again is consistent with the predictions Alberta Education as reported in chapter 2.

Relationships were found between expenditures per pupil and changes in enrolment and between changes in expenditure per pupil and changes in enrolment for only one of the years studied (see tables 4 and 5). This parallels findings in Junior High Instruction. Again the findings of significant relations in this one year is noteworthy but not of lasting importance. As a general finding, no relationship was indicated between enrolments and expenditures.

Differences in expenditures per pupil among size groups and among enrolment change groups indicated generally that there were no consistent differences. 1975 and 1976 were found to have significant F-ratios (see tables 6 and 9) indicating a difference among size groups, however 1977 and 1978 had no significant F-ratios. Therefore the general conclusion is that there is no difference. No significant

ratios indicating a difference among enrolment change groups were found. No interaction effects were found between total enrolment and enrolment change in this budget area. Tests for a lag in the effects of enrolment change found no significant F-ratios.

Expenditures per pupil in the budget area Senior High Instruction were not affected by total jurisdiction enrolment or by enrolment change.

G. Special Education

The mean expenditures per pupil in this budget area were calculated on the basis of total pro-rated pupils in each jurisdiction (see table 1). They almost doubled during the period of this study. The mean expenditures per pupil were:

1975 - $33

1976 - $39

1977 - $51

1978 - $63

Tests were conducted to find relationships between expenditures and total enrolment, between expenditures and change in enrolment, and between change in expenditures and change in enrolment. No relationships were found in this budget area.

ANOVA tests found no significant differences among jurisdiction size groups or among enrolment change groups. No significant interaction effects were found between size

groups and enrolment change groups.

Tests to find a lag in the effects of enrolment change also found no significant results.

The conclusion for this budget area is very clear. No significant results were found to indicate that jurisdiction enrolment size or enrolment change have an effect on expenditures per pupil in this budget area.

H. Community Services

This was the only budget area in which the mean expenditure per pupil actually decreased during the study. The mean expenditures per pupil were:

1975 - $ 4
1976 - $10
1977 - $ 9
1978 - $ 8

No significant relationships were found in this budget area.

ANOVA and ANCOVA tests to find significant differences in expenditures which might be related to jurisdiction size or enrolment change resulted in one significant F-ratio (see table 11). In 1976 (but not in 1977 or 1978) an interaction effect was found between size and enrolment change. This result is noteworthy but not of lasting importance because it appears in only one of the three possible years. Generally, therefore, the conclusion of this study is that there were no significant differences among the jurisdiction

size groupings or among the enrolment change groupings.

No significant results were found to indicate a lag in the effects of enrolment change.

Expenditures per pupil in the budget area, Community Services, were not discovered to be affected by enrolment change or by jurisdiction size.

I. Pupil Personnel

The budget area, Pupil Personnel, differs from the other budget areas in this study in that it ceased to exist as a separate budget area in 1977. Because of this, all findings of this study rely on data from 1975 and 1976 only. This budget area also differs from others in that the most significant results were found here. Despite the significance of these results, however, their importance diminishes because budget area is no longer reported seperately.

Mean per pupil expenditures were $11 in 1975 and almost $12 in 1976. Compared to other budget areas (table 1) this was relatively little change.

Expenditures per pupil were found to be very significantly related to total jurisdiction enrolment (table 3) with correlations of approximately +.40 and probabilities approaching zero. No relationships were found between expenditures and enrolment change. This finding indicates that expenditures per pupil in the budget area Pupil Personnel were greater in larger jurisdictions. This budget

area includes guidance and counselling services, social and psychological services, food services, and health services. It is logical that these services could be provided more easily in the larger jurisdictions.

The above findings were substantiated by the analysis of variance tests for differences among jurisdiction size groups (see tables 6,7 and 9). Significant differences were found among size groupings. Significant differences were not found among enrolment change groupings. No interaction efect was found between jurisdiction size and enrolment change.

Because of the incomplete nature of the data, as explained above it was not possible to analyze the lag effects of enrolment changes from previous years.

Jurisdiction size, therefore, was a major factor in determining expenditures per pupil in the budget are Pupil Personnel. About 16% (correlation coefficient squared) of the variance in expenses in this area were related to jurisdiction size. However, because this budget area no longer exists, these findings have little current meaning.

J. Administration

Administration was one of four budget areas in which were found interesting and significant results for this study.

The mean expenditures per pupil for this budget area rose greatly toward the end of the period of this study:

1975 - $ 95

1976 - $ 95

1977 - $108

1978 - $122

Significant relationships between total enrolment and expenditures per pupil were found for three of the four years analyzed (see table 3). These relationships had correlation coefficients of approximately -.21 with probabilities of approximately .014. No significant relationships were found between expenditures per pupil and enrolment change (see tables 4 and 5).

Significant differences were also found in this budget area (see tables 6, 7 and 9). It was found that the group of Alberta school jurisdictions having between 500 and 799 students consistently showed mean expenditures at least 50% higher than the mean expenditures of the groups having over 1800 students. The smaller group, ie. group 4, was found to significantly differ from groups 7, 9, 10 and 11.

No significant differences in mean per pupil expenditures for administration were found among enrolment change jurisdiction groups.

No interactions were detected between jurisdiction size and enrolment change which affected per pupil expenditures significantly.

Tests for a lag in the effects of enrolment change found that no increase in the statistical significance was found when the effects of previous year enrolment changes were removed.

K. Operations and Maintenance

The budget area, Operations and Maintenance, was the second of the four budget areas which yielded consistently significant results.

The mean expenditures per pupil for Operations and Maintenance rose 50% in three years. These mean expeditures were:

1975 - $155
1976 - $178
1977 - $207
1978 - $235

Correlation coefficients found in testing the relationship of expenditures per pupil with, first total enrolment and then, changes in enrolment indicated no significance. These tests would seem to indicate that there is no relationship between enrolments and expenditures per pupil in this budget area. This would also seem to discount theories that simple economics of scale are in effect. These findings are not consistent with those described below.

Analysis of variance tests consistently found that there were significant differences among the jurisdiction size groups but not among the enrolment change groups. Findings showed that jurisdictions having less than 154 students spent significantly more than jurisdictions having between 339 and 487 pupils (see table 16). A short investigation of the means for all jurisdictions size groups

(Appendix II) shows that in 1978 only groups 2 and 3 spent less than $255 in this area. Group 2, jurisdictions of 175 to 300 pupils, had a mean expenditure per pupil of $171. Group 3, jurisdictions with between 300 and 500 students, had the lowest mean expenditure per pupil at $153. The question arises naturally here as to what it is about jurisdictions between the sizes of 175 and 500 which causes them to spend so much less than smaller and larger jurisdictions in the budget area, Operations and Maintenance. No answer can be proved in this thesis.

Tests for interactios between jurisdiction size and enrolment change found no significant results.

Tests for a lag in the effects of enrolment change also resulted in no significant findings.

In conclusion, findings indicated that while no significant overall relationships were found, jurisdictions having between 175 and 500 students tended to spend less per pupil than other jurisdictions for Operations and Maintenance costs.

L. Transportation

Transportation is the third of the four budget areas in which consistent significant results were found. As in the above two areas, Administration and Operations and Maintenance, expeditures per pupil for Transportation were affected by jurisdiction size but not by enrolment change. The mean expenditures per pupil for transportation were:

1975 - $109

1976 - $121

1977 - $125

1978 - $147

This was an increase of roughly 35% over 3 years.

As was the case with Operations and Maintenance, so too with Transportation, no significant correlations were found between expenditure and size, nor between expenditure and enrolment change. ANOVA tests to find differences among enrolment change groups indicate no significant results. However, when ANOVA tests were used to investigate size groups, significant differences were found between size groups (see table 6, 7, and 9). This would seem to indicate size does have an effect of some nature on expenditures per pupil.

Visual inspection of the mean expenditures per pupil of the eleven size groups (see table 17) suggested that there may be a curvilinear relationship between expenditures and size. Tests for a curvilinear relationship found a .0072 probability of error if a curvilinear relationship was assumed. The conclusion drawn therefore is that a curvilinear relationship did in fact exist between expenditure per pupil and jurisdiction size. This curvilinear relationship is such that the expenditure per pupil is least in jurisdictions of 175 to 300. The expenditure per pupil increases as the jurisdiction size increases until an enrolment of about 800. This level of

expenditure stays roughly constant for jurisdictions between 800 and 3100. As the enrolment size increases above 3100 the expenditure per pupil for transportation decreases dramatically. The parameters of the curvilinear relationship may be the most important single finding of this study because knowing these figures makes differential funding for equal treatment of jurisdictions, a possibility.

In the budget area, transportation, no interaction effects between size and enrolment change were found. No lag in the effects of enrolment change were found. In conclusion, therefore, the only relationship between expenditures and enrolment in this budget area was a curvilinear relationship between the expenditure per pupil and the jurisdiction size.

M. Capital Outlay and Debt Services

This is the fourth and final budget area in which consistently significant results were found.

The mean expenditure per pupil for Capital Outlay and Debt Services rose by only 25% over three years. The mean expenditures were:

1975 - $145
1976 - $144
1977 - $167
1978 - $181

Unlike the above budget area, expenditures for Capital Outlay and Debt Services were not found to be related to

jurisdiction size. Rather, this was the only budget area to consistently indicate a relationship between expenditure per pupil and change in enrolment. This correlation was in the order of .17 (see table 4) which would indicate that just under 3% of the variance in expenditures for Capital Outlay and Debt Services can be accounted for by a change in enrolment.

Analysis of Variance tests confirmed the above results in that differences were found between enrolment change groups (see tables 8 and 10) but not between size groups. Declining enrolment jurisdictions and increasing enrolment jurisdictions were found to have significantly different mean expenditures per pupil in this budget area.

No interation between enrolment change and jurisdiction size was found. Also, no lag in the effects of enrolment change was found.

It is the conclusion of this study that Capital Outlay and Debt Services is the only budget area affected by changing enrolments. Expenditures per pupil for Capital Outlay and Debt Services are not significantly affected by jurisdiction size.

N. Total Operational Expenditures

Mean expenditures per pupil rose by 40 percent in the three years between 1975 and 1978. The mean expenditures in this budget area were:

1975 - $1432

1976 - $1605
1977 - $1782
1978 - $2008

The mean change in total enrolment decreased between the four years:

1. Between 1975-76.....+24.38 students per jurisdiction.
2. Between 1976-77.....+ 4.35 students per jurisdiction.
3. Between 1977-78.....-13.69 students per jurisdiction.

Correlation tests to find relationships between expenditures and both jurisdiction size and enrolment change revealed no significant results.

Analysis of Variance tests indicated that a significant difference exists among jurisdiction size groups. The ANOVA with repeated measures (see table 7) shows a significant difference among size groups over the three repeated measures. Because of the increased strength of the ANOVA with repeated measures, it must be concluded that there is a difference among size groupings, inspite of the less consistent results shown on tables 6 and 9. From a visual inspection of mean per pupil expenditures for each size grouping (Appendix II) it was decided that groups 2 and 3 (ie. jurisdictions having between 175 and 500 students) tended to have lower mean expenditures per pupil in the budget area total operational expenditures.

The results found within total operational expenditures are interpreted as the cumulative result of similar differences in lesser budget areas such as Operations and Maintenance, and Transportation. The differences found in these areas are combined in the results shown for Total Operational Expenditures. ANOVA results show up because of the combined effects of these differences, however correlation results are not evident, probably because of the curvilinear relationship within transportation.

No interaction between enrolment change and jurisdiction size effecting per pupil expenditures was found.

Although significant F-ratios were found for 1978 when the effects of enrolment change for previous years were removed, similar results were not found for 1977. It is therefore concluded that there is not enough evidence to indicate a lag in the effects of enrolment change in the budget area Total Operational Expenditures.

O. Surplus

This budget area includes deficits. Surpluses were recorded as positive values while deficits were recorded as negative surpluses.

The mean surplus per pupil for each of the years studied was:

1975 - +$31.55

1976 - +$ 7.95

1977 - +$15.04

1978 - +$13.53

In correlation tests to locate relationships between the surplus (or deficit) per pupil and both jurisdiction size and enrolment change, no significant correlations were found.

In ANOVA tests for differences among size groups and for differences among enrolment change groups only one significant result was found (see table 6). This one was judged to be spurious and therefore unimportant.

No interation effects or lag effects were found.

This budget area would appear to be unaffected by jurisdiction size or enrolment change.

P. Total Expenditures

The mean total expenditures per pupil for Alberta jurisdictions were:

1975 - $1475

1976 - $1631

1977 - $1815

1978 - $2048

In every finding, the results of the budget area, Total Expenditures, closely paralleled those for the budget area Total Operational Expenditures. The conclusion therefore, is that taking Surplus and Deficit into account, as Total Expenditures does, adds no significant new information.

Q. Conclusions

School jurisdictions having a declining enrolment were found to spend significantly less on the average for capital projects (land, buildings, equipment, vehicles, etc.) than jurisdictions having an increasing enrolment. Therefore the first conclusion of this thesis is that changing enrolments affect the expenditure per pupil only in the area of Capital Outlay and Debt Services. An explanation for this finding must be two-pronged. First, why weren't significant findings recorded for other budget areas? The reason must be that either declining enrolment jurisdictions never were significantly affected financially or that the Declining Enrolment Grant was fulfilling its mandate to help declining enrolment jurisdictions. There is considerable documentation that the first solution is not true (for example see Meek, 1979). The second solution agrees with that of the School Business Officials of Alberta (1976) in that they stated that the Declining Enrolment Grant was "fulfilling a need."

The question which arises is: Why did a significant difference in expenditures occur between declining and increasing jurisdictions in the area of Capital Outlay and Debt Services? The answer is obvious. Declining enrolment jurisdictions would stop (as a generalization) building while increasing enrolment jurisdictions would need increased facilities to meet the needs of a growing enrolment.

The second major conclusion of this study is that the

size of jurisdiction was a factor in determining expenditures per pupil in three currently operating budget areas:

1. <u>Administration.</u> Jurisdictions having between 500 and 800 students were found to spend approximately 50% more per pupil than jurisdictions having over 1800 pupils. This may be due to economies of scale in some way but no obvious reasons can be given in this thesis.
2. <u>Operations</u> <u>and</u> <u>Maintenance.</u> Jurisdictions having between 175 and 500 pupils spent 66%(or less) per pupil as much as other jurisdictions (on the average). Again, this may be due to economies of scale.
3. <u>Transportation.</u> A curvilinear relationship exists for expenditures under this budget area such that jurisdictions having between 175 and 300 pupils spend least, jurisdictions having between 800 and 3100 pupils spend most and jurisdictions with more than 3100 spend less and less per pupil as their size increases. This is logical in that those jurisdictions having between 800 and 3100 students also tend to be the counties and divisions which have the largest areas.

The third major conclusion of the present study is that Total Operational Expenditures were affected by jurisdiction size. Jurisdictions having between 175 and 500 students

spent over 10% less per pupil than did all other jurisdictions.

In summary, then, enrolment change had little effect on most budget areas reported to Alberta Education. The reason for this could be that Declining Enrolment Grant adequately made up for any financial deficiencies which otherwise might have been caused by declining enrolments. Jurisdiction size, on the other hand, did have some effect on Administration, Operations and Maintenance, Transportation, and therefore on Total Operational Expenditures. It is the conclusion of this study that there was no interaction between enrolment change and jurisdiction size which affected per pupil expenditures. Finally, no lag in the effects of enrolment change were found.

VI. SUMMARY, IMPLICATIONS AND SUGGESTIONS FOR FURTHER RESEARCH

A. Introduction

This final chapter contains a summary of the problem, research design, findings and conclusions of the study. Possible implications for educational finance in Alberta are also briefly outlined. Suggestions for future research are provided.

B. A Review of the Problem

The problem for this study emerged from a desire to understand the current furor over declining enrolments. Alberta had introduced a fiscal equalization grant, called the Declining Enrolment Grant. The purpose of this grant was to alleviate some of the burden which would be caused by lost revenues in declining enrolment jurisdictions. Few studies were found which assessed the effects of declining enrolments in Alberta and no studies were found which determined the effectiveness of this grant. The possibility that such declining enrolment revenue losses may have affected school jurisdictions differentially, particularily with respect to their size, prompted an examination of size, enrolment change, expenditure relationships for this study. The purpose of this study, therefore, was to check for expenditure differences among comparable size and enrolment change groupings of school jurisdictions and to report the

areas where such fiscal differences may have occured.

Thus the general problem for this study, as outlined in Chapter 1, was to examine the effect of enrolment size and change on per pupil expenditures in Alberta school jurisdictions. In addition to the above problem, three related subproblems were formulated which, in effect, divided the general problem into three statistical areas of investigation. Subproblem 1 asked about the relationships (correlations) between:

1. expenditures per pupil and jurisdiction size
2. expenditures per pupil and enrolment change
3. expenditures per pupil change and enrolment change

Subproblem 2 looked for differences among jurisdiction groups (both size groups and enrolment change groups) which might show the financial implications of enrolment change and magnitude. In addition, subproblem 2 searched for an interaction between jurisdiction size and enrolment change which might have affected per pupil expenditures. Subproblem 3 was formulated to focus attention on the question of a possible time lag in the effect of changing enrolments. Together, these subproblems were used to focus attention on various approaches to the main problem.

C. Research Design and Procedures

Basically, the design for this study was one which involved three kinds of tests on the same data. Each of these three tests were repeated using corresponding data for

a total of at least three years. The repeated measures (years) were compared to identify spurious results. Results which were identified as consistent for all tests across all repetitions (years) are reported as the findings of this study.

The three basic tests used were:

1. Correlation Analysis
2. Analysis of Variance (ANOVA)
3. Analysis of Covariance (ANCOVA)

Each of these three tests were applied to the expenditure per pupil data and results were compared in order to determine if jurisdiction size or enrolment change were factors in determining expenditure per pupil. In each application of one of these tests, the test was repeated on comparable expenditure per pupil data for each of at least 3 years. If the results were not consistent for each of the three years they were considered to have happened by chance alone and were not used.

The data analyzed consisted of pro-rated enrolments and per pupil expenditures for each of 133 operating school jurisdictions in Alberta. The data also covered each of the years 1975-1978. These years were selected because they were the years following the introduction of the declining enrolment grant. Expenditure per pupil data was analyzed for each budget area (program).

As described in Chapter 4 the research procedures essentially called for the following:

1. Extraction of enrolment and financial data
2. Preparation of data for computer analysis by excluding nine jurisdictions with incomplete data for the years required.
3. Transformation of the data to "pro-rated enrolment" and "expenditure per pupil" figures.
4. Analysis of Subproblem 1 (relationship) for each budget area.
   a. Correlations between jurisdiction size and expenditure per pupil.
   b. Correlation between change in enrolment and expenditure per pupil.
   c. Correlation between change in enrolment and change in expenditure per pupil.
5. Analysis of Subproblem 2 (differences)for each budget area.
   a. One-way ANOVA by size group repeated four times.
   b. Two way ANOVA by size and repeated measure.
   c. Two way ANOVA by size group and enrolment change group.
   d. One way ANCOVA by size group with enrolment change as a covariant.
   e. Student-Newman-Keuls procedure to locate differences on significant findings of one way ANOVA tests.
6. Analysis of Subproblem 3 (lag) for each budget area.
   a. One way ANCOVA by size group with enrolment

change of one year previous as covariant (repeated twice).

b. One way ANCOVA by size with enrolment change of two years previous to the expenditure data as the covariant (no repeated measure).

D. Summary of Findings and Conclusions

Each budget area (program) was discussed separately in the conclusions shown in Chapter 5. The most noteworthy findings were in the four budget areas Administration, Operations and Maintenance, Transportation and Capital Outlay/Debt Services. The largest two budget areas analyzed, Total Operational Expenditures and Total Expenditures were also found to have been affected slightly by enrolment size but since these were seen to have been related to findings in one of the above four areas they have not been discussed in great length in this thesis.

In the budget area, Administration, a significant relationship was found between jurisdiction size and expenditures per pupil. Jurisdictions having between 500 and 800 students spent approximately 50% more per pupil, on the average, than did jurisdictions having more than 1800 pupils.

The Operations and Maintenance area was also found to have a significant relationship between jurisdiction size and expenditure. In this budget area, jurisdictions having between 175 and 500 pupils spent about two-thirds as much

per pupil, on the average, as jurisdictions both smaller and larger.

The budget area, Transportation was perhaps the most interesting finding of this study. Transportation expenditures were found to have a clear curvilinear relationship to jurisdiction size. The smallest jurisdictions had a mean per pupil expenditure which, for the purpose of illustration, could be called, arbitrarily, "level x". Jurisdictions having between 800 and 3100 pupils had a mean per pupil expenditure for transportation considerably higher than "level x". Finally the very largest jurisdictions had a mean per pupil expenditure which, though higher than "level x", was lower than the jurisdictions having between 800 and 3100 pupils. This curvilinear relationship was demonstrated clearly in all four of the years analyzed.

Finally, expenditures in the budget area Capital Outlay/Debt Services were found to have been affected significantly by enrolment change. This was the only budget area in which jurisdictions with declining enrolments had expenditures per pupil which were significantly less than jurisdictions with increasing enrolments. Jurisdictions considered to have stable enrolments were not found to differ significantly from either increasing or declining enrolment jurisdictions.

The following conclusions may be drawn from the data:

1. Following the introduction of the declining enrolment grant in 1975, enrolment change (ie. declining or increasing enrolment) ceased to become a factor effecting expenditures per pupil except in one area, i.e. Capital Outlay and Debt Services.
2. The other major factor in this study, total jurisdiction size (as measured by total pro-rated enrolments for 1978) was found to affect per pupil expenditures for Administration, for Operations and Maintenance, and for Transportation.
3. No interaction which might affect expenditures between enrolment change on expenditure per pupil was found.
4. No lag in the effects of enrolment change on expenditure per pupil was found.

E. Implications

The first implication of the findings of this study is that between 1975 and 1978 declining enrolments had very little significant effect on the expenditures of Alberta school jurisdictions. The reason for this lack of major differences between declining enrolment jurisdictions and increasing enrolment jurisdictions in most budget areas may have been due to the compensating influence of the Declining Enrolment Grant.

The second implication of this study is that jurisdiction size, as measured by total enrolment, is a

possible predictor of relative expenditures per pupil for transportation. Therefore, because a predictable curvilinear relationship was found for expenditures in transportation, this relationship could, if necessary, be used to formulate a equalizing grant structure for transportation.

A third implication is that jurisdictions between the sizes of 500 and 800 pupils may need additional revenue for administrative expenses.

Finally, there are two findings which do not indicate any need for action. The fact that small jurisdictions spend less for Operations and Maintenance would not indicate that a change is required. The fact that declining enrolment jurisdictions tend to spend less than increasing enrolment jurisdictions for Capital Outlay and Debt Services would not be considered undesirable.

F. Suggestions for Further Research

During this study several questions were encountered which, although related, were not within the immediate scope of this study. Some of them are listed below which may provide a basis for the refinement of the methods used in this thesis or which may provide directions for new roads of exploration:

1. A study limited to the investigation of changing enrolments using ANOVA statistical methods might improve upon the information found in this study by dividing enrolment change into five or seven groups

based on the degree of change. In this thesis only three groups are analyzed: increasing, stable and decreasing enrolment jurisdictions.

2. In any future studies similar to this the ANOVA test could be given additional strength if the number of jurisdiction size groups were reduced. One recommendation for this would be to combine groups 1 through 4 and groups 5 through 8 into two larger groups. Jurisdiction size groups 9, 10, and 11 should remain unchanged.
3. The question of lag in the effects of enrolment change was not sufficiently analyzed here. The problem one might encounter in studying "lag effects" may be in the fact that an enormous amount of data, i.e. over many years, would be necessary to generate valid experimental observations. However a much better analysis needs to be done than that done here.
4. Adequate price indices might be used so that expenditure per pupil data might be compared across years.
5. Early Childhood Education expenditures would be better analyzed in a separate study using ECS enrolments.
6. Other factors influencing the expenditures of a jurisdiction might be studied:

   a. "sparsity of population" as measured by acres

per pupil.

b. "remotemess" as measured by distances from a large population center.

c. length of service of the superintendent.

d. mean age of board members.

e. average school size within the jurisdiction.

f. pupil teacher ratio.

Each of these factors could have an effect on the expenditure per pupil of jurisdictions within this province.

7. Finally, a study needs to be done, comparing the results of studies done across Canada which attempt to assess the financial implications of changing enrolments.

BIBLIOGRAPHY

ALBERTA EDUCATION
School Grants Regulations 1979 Edmonton:Government of Alberta, 1979.

ALBERTA EDUCATION
Annual Forcast of Alberta School Enrolments 1978-1987: A Summary. Edmonton:Government of Alberta, Fall 1978.

ALBERTA EDUCATION
Annual Report. Edmonton: Government of Alberta, 1972-1979.

ALBERTA EDUCATION
Financial and Statistical Report. Edmonton: Government of Alberta. 1975-1978.

ALBERTA EDUCATION
The Minister's Advisory Committee on School Finance. Edmonton: Government of Alberta, 1975.

ALBERTA EDUCATION
Program Accounting and Budgeting: Classification and Coding Manual. Edmonton: Government of Alberta, 1975.

ATHERTON, Peter J.
"Financing Education in a Time of Declining Enrolments." Paper presented to the C.A.S.E.A. June 7, 1977.

BUMBARGER, Chester S. and RATSOY, Eugene W.
Financing Small School Jurisdictions: An Analysis and Proposal for Alberta. Edmonton: Department of Educational Administration, University of Alberta, 1975.

DIVISION OF EDUCATIONAL RESEARCH SERVICES (DERS).
"ANOVA26". Edmonton: Faculty of Education, University of Alberta, May 1979.

DIVOKY, Diane
"Burden of the Seventies: The Management of Decline." Phi Delta Kappan. Oct. 1979.

FAST, Raymond
"Declining Enrolments: Implications and Solutions" Challenge. Vol. XVII, Nos. 1, 2, 3, and 4., 1978.

FENNELL, Brian Harold
An Analysis of Variations Among Unit Costs of the Schools in of the Cost Analysis Research Project. Unpublished Master's thesis. Edmonton: The University of Alberta, 1972.

JACKSON, R.W.B.
Implications of Declining Enrolment for the Schools of Ontario: A Statment of Effects and Solutions. Final Report Toronto: Commission on Declining Enrolments in Ontario (CODE) 1978.

JAMES, H. Thomas
"Damping Down the System" School Business Affairs. Vol. 43, Aug 1977, p.176.

LUCAS, John T.
"Coping with Declining Enrolments" School Business Affairs. Vol. 43, July 1977, pp. 149-151.

MEEK, James Collins III
Local School Board Revenues and Expenditures in a Period of Declining Enrolments. Unpuplished doctoral disertation. Edmonton: The University of Alberta, 1979.

MOFFATT, H. P.
Educational Finance in Canada. Toronto: W. J. Gage Limited, 1957.

NIE, Norman H., HULL, C. Hadlai, JENKINS, Jean G., STEINBRUNNER, Karin and BENT, Dale H.
SPSS:Statistical Package for the Social Sciences. (2nd. ed.;) New York: McGraw-Hill,1975.

RICHARDS, Donald M.
"Does the Nature of the Funding Make a Difference? Grants to Alberta Local School Authorities" Challenge. Vol. XVIII No 4., 1979.

SCHOOL BUSINESS OFFICIALS OF ALBERTA
1976 School Finance Study Edmonton: Alberta Education, May 1978.

SCHWARTZ, Arthur M.
Declining Enrolment: Implications for British Columbia's Public School System. B.C.:Educational Research Institute of British Columbia, 1977.

ZSIGMOND, Z. E. and WENAAS, C. J.
Enrolment in Educational Institutions by Province: 1951-2 to 1980-81. Ottawa: Economic Council of Canada, 1970.

APPENDIX I

The Jurisdictions of Alberta divided into deciles on the basis of pro-rated (January to December) 1978 Enrolments.

First decile

1.	Waterton	19
2.	Lousana	38
3.	Nampa	54
4.	Barons	55
5.	Killam (Catholic)	59
6.	Grovedale	81
7.	Assumption (Catholic)	82
8.	Spirit River (Catholic)	96
9.	Sexsmith	100
10.	Beaverlodge (Catholic)	104
11.	Ft. Vermilion (Catholic)	121
12.	Berry Creek S.D.	141
13.	Picture Butte (Catholic)	153
14.	Theresetta (Catholic)	154

Second decile

1.	Bow Island (Catholic)	193
2.	Stirling	196
3.	McLennan (Catholic)	206
4.	Grande Centre (Catholic)	206
5.	Grimshaw (Catholic)	208
6.	Rosary (Catholic)	214
7.	St. Martins (Catholic)	226
8.	Wainwright (Catholic)	232
9.	Provost (Catholic)	252
10.	Valleyview (Catholic)	257
11.	Drumheller (Catholic)	259
12.	Cold Lake (Catholic)	267
13.	Wetaskiwin (Catholic)	268
14.	Coaldale (Catholic)	271
15.	Ponoka (Catholic)	292

Third decile

1.	Whitecourt (Catholic)	339
2.	Vermilion (Catholic)	340
3.	Drayton Valley (Catholic)	362
4.	St. Thomas More (Catholic)	414
5.	Pincher Creek (Catholic)	415
6.	Legal	420
7.	High Prairie (Catholic)	424
8.	Westlock (Catholic)	428
9.	Falher	449
10.	Bonneyville Regional High School	458
11.	Swan Hills	465
12.	Camrose (Catholic)	474
13.	Glen Avon	487

Fourth decile

1.	St. Paul Regional High School	501
2.	Ft. Saskatchewan (Catholic)	546
3.	Taber (Catholic)	555
4.	Neutral Hills S.D.	582
5.	Starland S.D.	618
6.	Bonneyville	624
7.	Peace River (Catholic)	644
8.	Red Cliff	645
9.	Jasper	651
10.	Thibault (Catholic)	776
11.	Acadia S.D.	778
12.	Medicine Hat S.D.	799

Fifth decile

1.	St Paul	895
2.	County Stettler	900
3.	Provost S.D.	902
4.	County Thorhild	969
5.	Rangeland S.D.	969
6.	Devon	1033
7.	County Paintearth	1063
8.	Grande Prairie (Catholic)	1105
9.	County Forty Mile	1149
10.	Grande Cache	1158
11.	County Smokey Lake	1171

Sixth decile

1.	County Two Hills	1314
2.	Stettler (Catholic)	1324
3.	Pincher Creek S.D.	1344
4.	County Vulcan	1421
5.	Red Deer (Catholic)	1434
6.	Drumheller S.D.	1508
7.	Crowsnest Pass S.D.	1525
8.	Fairview S.D.	1550
9.	County Newell	1609
10.	Spirit River S.D.	1648
11.	Wetaskiwin City	1666
12.	Wainwright S.D.	1726
13.	County Lamont	1727
14.	Three Hills S.D.	1741
15.	County Warner	1779
16.	Ft McMurray (Catholic)	1780

Seventh Decile

1.	County St. Paul	1816
2.	Camrose City	1876
3.	County Minburn	1897
4.	East Smokey S.D.	1897
5.	Medicine Hat (Catholic)	1921
6.	Brooks	1942
7.	County Beaver	2010
8.	County Wheatland	2095
9.	County Camrose	2130
10.	County Vermilion River	2132
11.	County Wetaskiwin	2147
12.	County Flagstaff	2197
13.	Lethbridge (Catholic)	2203
14.	Sherwood Park (Catholic)	2257
15.	Lac La Biche S.D.	2271
16.	County Athabaska	2283

Eighth decile

1.	County Barrhead	2380
2.	St Albert (Catholic)	2393
3.	Ft Vermillion S.D.	2450
4.	Westlock S.D.	2473
5.	Northland S.D.	2542
6.	Taber S.D.	2609
7.	Bonneyville S.D.	2719
8.	Peace River S.D.	2751
9.	Cardston S.D.	2792
10.	County Grande Prairie	2932
11.	County Lethbridge	2977
12.	Willow Creek S.D	3065
13.	Rocky MountainS.D.	3090

Ninth decile

1.	County Ponoka	3239
2.	Grande Prairie City	3346
3.	High Prairie S.D.	3482
4.	County Lac Ste. Anne	3656
5.	County Lacombe	3666
6.	Sturgeon S.D.	3976
7.	Foothills S.D.	3983
8.	Ft. McMurray	4048
9.	County Mountain View	4207
10.	County Red Deer	4531
11.	St. Albert (protestant)	4641

Tenth group

1.	Yellowhead S.D.	5191
2.	Medicine Hat City	5573
3.	Rocky View S.D.	5715
4.	County Leduc	5998
5.	Red Deer City	6118
6.	Lethbridge City	7531
7.	County Parkland	8901

Eleventh group

1.	County Strathcona	12461
2.	Calgary (Catholic)	21322
3.	Edmonton (Catholic)	27760
4.	Edmonton City	63804
5.	Calgary City	81243

This list is comprised of 133 jurisdictions.

Note: The term 'Catholic' has been used instead of 'separate' to avoid the confusion created when trying to identify 'protestant separate' and 'Catholic public' systems.

APPENDIX II

Table 22
Early Childhood Education

Mean Expenditure Per Pupil in Each Group 1976 to 1978

Jurisdiction Size Groups

Group	1976	1977	1978	N
1.	$ 4.57	$ 4.50	$ 6.21	14
2.	$27.27	$30.53	$38.93	15
3.	$21.15	$19.69	$17.46	13
4.	$12.36(n=11)	$15.17	$17.08	12
5.	$15.82	$16.27	$18.18	11
6.	$20.50	$30.56	$30.00	16
7.	$15.75	$16.06	$17.81	16
8.	$24.62	$23.77	$28.38	13
9.	$15.82	$14.64	$15.09	11
10.	$ 5.14	$ 5.71	$ 7.00	7
11.	$27.20	$32.60	$32.80	5

Enrolment Change Groups

Group	1976	N	1977	N	1978	N
Decreasing	$11.89	38	$16.66	44	$16.82	62
Stable	$18.69	39	$19.74	39	$21.65	23
Increasing	$20.41	55	$21.08	50	$26.56	48

Total Budget Area

	1976	N	1977	N	1978	N
Total Group	$17.45	132	$19.23	133	$21.17	133

Table 23
Elementary Instruction

Mean Expenditure Per Pupil in Each Group 1976 to 1978

Jurisdiction Size Groups

Group	1976	1977	1978	N
1.	$988.36	$1013.14	$1931.57	14
2.	$867.80	$ 957.07	$1037.93	15
3.	$752.38	$ 844.77	$ 941.62	13
4.	$839.25(n=11)	$ 944.58	$1061.50	12
5.	$890.18	$1029.91	$1128.73	11
6.	$896.75	$1018.13	$1123.81	16
7.	$918.06	$1007.50	$1155.13	16
8.	$947.77	$1111.62	$1177.62	13
9.	$912.36	$1026.64	$1109.36	11
10.	$935.29	$1067.57	$1203.29	7
11.	$977.00	$1145.40	$1265.40	5

Enrolment Change Groups

Group	1976	N	1977	N	1978	N
Decreasing	$898.11	73	$ 995.03	63	$1138.70	53
Stable	$906.37	19	$1063.33	18	$1141.12	25
Increasing	$891.24	41	$ 994.48	52	$1270.04	55

Total Budget Area

	1976	N	1977	N	1978	N
Total Group	$897.17	133	$1004.06	133	$1193.47	133

Table 24
Junior High Instruction

Mean Expenditure Per Pupil in Each Group 1976 to 1978

Jurisdiction Size Groups

Group	1976	1977	1978	N
1.	$1108.71	$1351.07	$1535.86	14
2.	$ 935.27	$1077.13	$1247.13	15
3.	$ 809.92	$ 905.54	$1038.31	13
4.	$ 998.25(n=11)	$1123.08	$1238.17	12
5.	$ 970.36	$1078.45	$1239.09	11
6.	$1013.19	$1094.00	$1238.63	16
7.	$ 973.63	$1061.13	$1200.31	16
8.	$ 953.38	$1058.54	$1203.61	13
9.	$ 859.18	$1022.91	$1225.91	11
10.	$ 977.14	$1289.71	$1276.14	7
11.	$ 973.80	$1145.00	$1262.80	5

Enrolment Change Groups

Group	1976	N	1977	N	1978	N
Decreasing	$ 940.38	34	$1165.42	52	$1253.99	82
Stable	$1137.33	21	$1084.83	23	$1150.50	14
Increasing	$ 925.88	78	$1049.64	58	$1261.19	37

Total Budget Area

	1976	N	1977	N	1978	N
Total Group	$962.98	133	$1100.99	133	$1245.10	133

Table 25
Senior High Instruction

Mean Expenditure Per Pupil in Each Group 1976 to 1978

Jurisdiction Size Groups

Group	1976	1977	1978	N
1.	$ 231.07	$ 297.71	$ 395.57	14
2.	$ 339.47	$ 391.20	$ 440.40	15
3.	$ 660.46	$ 744.15	$1380.85	13
4.	$1070.73(n=11)	$1143.83	$1288.67	12
5.	$3033.45	$3010.80	$3247.45	11
6.	$1421.81	$2794.38	$6269.06 *	16
7.	$1163.81	$1244.50	$1373.19	16
8.	$1056.69	$1153.00	$1293.85	13
9.	$1142.82	$1007.82	$1182.18	11
10.	$1219.57	$1211.79	$1549.71	7
11.	$1088.40	$1255.80	$1349.80	5

Enrolment Change Groups

Group	1976	N	1977	N	1978	N
Decreasing	$ 845.39	49	$1275.81	57	$2210.38	60
Stable	$1391.10	10	$1269.75	16	$1336.06	17
Increasing	$1210.04	73	$1479.97	60	$1707.89	56

Total Budget Area

	1976	N	1977	N	1978	N
Total Group	$1088.39	132	$1367.18	133	$1887.05	133

*This unexpected large amount is due to the large per pupil expenditure in Fort McMurray Separate ($79,579) which reported large expenditures and a senior high enrolment of 2 students.

Table 26
Special Education

Mean Expenditure Per Pupil in Each Group 1976 to 1978

Jurisdiction Size Groups

Group	1976	1977	1978	N
1.	$22.36	$24.57	$35.36	14
2.	$28.20	$46.60	$59.53	15
3.	$38.62	$48.00	$66.46	13
4.	$38.27(n=11)	$51.75	$54.08	12
5.	$50.73	$58.09	$69.64	11
6.	$53.06	$63.44	$75.38	16
7.	$34.25	$56.06	$60.25	16
8.	$33.15	$37.77	$51.92	13
9.	$46.45	$57.64	$80.73	11
10.	$46.14	$53.57	$63.86	7
11.	$65.80	$79.80	$95.00	5

Enrolment Change Groups

Group	1976	N	1977	N	1978	N
Decreasing	$43.82	38	$49.02	44	$66.60	62
Stable	$38.72	39	$47.62	39	$56.04	23
Increasing	$36.96	55	$54.48	50	$66.96	48

Total Budget Area

	1976	N	1977	N	1978	N
Total Group	$39.45	132	$50.66	133	$62.57	133

Table 27
Community Services

Mean Expenditure Per Pupil in Each Group 1976 to 1978

Jurisdiction Size Groups

Group	1976	1977	1978	N
1.	$ 0.00	$ 0.00	$ 0.00	14
2.	$40.40	$35.87	$17.67	15
3.	$ 6.62	$ 5.62	$ 9.00	13
4.	$ 0.00(n=11)	$ 7.83	$ 7.33	12
5.	$ 3.27	$ 3.45	$ 5.82	11
6.	$ 7.81	$ 8.19	$11.06	16
7.	$ 4.00	$ 5.31	$ 6.63	16
8.	$15.92	$ 6.08	$ 6.54	13
9.	$16.64	$ 8.82	$ 9.09	11
10.	$ 2.00	$ 2.29	$ 3.14	7
11.	$12.80	$15.20	$18.00	5

Enrolment Change Groups

Group	1976	N	1977	N	1978	N
Decreasing	$ 4.95	38	$ 5.89	44	$ 8.76	62
Stable	$20.77	39	$ 7.95	39	$12.26	23
Increasing	$ 7.04	55	$13.16	50	$ 6.02	48

Total Budget Area

	1976	N	1977	N	1978	N
Total Group	$10.49	132	$9.23	133	$8.38	133

Table 28
Pupil Personnel

Mean Expenditure Per Pupil in Each Group 1976 to 1978

Jurisdiction Size Groups

Group	1976	1977	1978	N
1.	$ 0.46	- not reported -		14
2.	$ 1.20			15
3.	$ 1.54			13
4.	$ 4.91(n=11)			12
5.	$ 5.64			11
6.	$16.50			16
7.	$12.75			16
8.	$16.54			13
9.	$10.00			11
10.	$23.29			7
11.	$59.40			5

Enrolment Change Groups

Group	1976	N	1977	N	1978	N
Decreasing	$ 6.45	38	- not reported -			
Stable	$12.49	39				
Increasing	$12.36	55				

Total Budget Area

	1976	N	1977	N	1978	N
Total Group	$10.70	132	- not reported -			

Table 29
Administration

Mean Expenditure Per Pupil in Each Group 1976 to 1978

Jurisdiction Size Groups

Group	1976	1977	1978	N
1.	$108.21	$121.71	$134.93	14
2.	$110.80	$126.80	$145.53	15
3.	$101.92	$114.92	$135.62	13
4.	$127.55(n=11)	$148.92	$160.08	12
5.	$100.36	$114.00	$134.73	11
6.	$ 92.50	$104.31	$123.13	16
7.	$ 82.00	$ 91.63	$101.56	16
8.	$ 87.46	$ 96.62	$108.08	13
9.	$ 76.27	$ 85.82	$ 98.36	11
10.	$ 70.71	$ 79.71	$ 80.57	7
11.	$ 61.60	$ 70.80	$ 80.60	5

Enrolment Change Groups

Group	1976	N	1977	N	1978	N
Decreasing	$101.39	38	$109.52	44	$123.26	62
Stable	$ 96.13	39	$112.44	39	$132.87	23
Increasing	$ 90.51	55	$103.68	50	$116.44	48

Total Budget Area

	1976	N	1977	N	1978	N
Total Group	$ 95.30	132	$108.18	133	$122.46	133

Table 30
Operations and Maintenance

Mean Expenditure Per Pupil in Each Group 1976 to 1978

Jurisdiction Size Groups

Group	1976	1977	1978	N
1.	$226.50	$222.50	$293.50	14
2.	$143.07	$169.33	$171.87	15
3.	$121.46	$147.54	$152.62	13
4.	$180.27(n=11)	$221.75	$251.17	12
5.	$173.45	$200.55	$234.82	11
6.	$199.00	$226.13	$265.19	16
7.	$173.75	$207.63	$231.25	16
8.	$209.46	$255.46	$279.08	13
9.	$171.36	$205.73	$225.82	11
10.	$178.43	$200.00	$234.57	7
11.	$199.00	$231.60	$262.40	5

Enrolment Change Groups

Group	1976	N	1977	N	1978	N
Decreasing	$199.74	38	$205.41	44	$240.23	62
Stable	$169.00	39	$223.77	39	$259.87	23
Increasing	$171.31	55	$195.14	50	$216.79	48

Total Budget Area

	1976	N	1977	N	1978	N
Total Group	$178.81	132	$206.93	133	$235.17	133

Table 31
Transportation

Mean Expenditure Per Pupil in Each Group 1976 to 1978

Jurisdiction Size Groups

Group	1976	1977	1978	N
1.	$124.64	$110.79	$167.07	14
2.	$ 26.53	$ 28.87	$ 37.20	15
3.	$ 34.38	$ 38.69	$ 43.85	13
4.	$180.18(n=11)	$168.17	$185.33	12
5.	$171.45	$191.09	$214.45	11
6.	$145.50	$149.06	$179.19	16
7.	$161.31	$173.94	$194.81	16
8.	$173.77	$185.15	$205.85	13
9.	$131.36	$133.55	$151.64	11
10.	$ 98.00	$105.57	$116.86	7
11.	$ 44.60	$ 50.20	$ 58.20	5

Enrolment Change Groups

Group	1976	N	1977	N	1978	N
Decreasing	$145.13	38	$163.50	44	$168.19	62
Stable	$119.90	39	$119.87	39	$185.04	23
Increasing	$105.25	55	$ 95.44	50	$100.06	48

Total Budget Area

	1976	N	1977	N	1978	N
Total Group	$121.06	132	$125.12	133	$146.52	133

Table 32
Capital Outlay and Debt Services

Mean Expenditure Per Pupil in Each Group 1976 to 1978

Jurisdiction Size Groups

Group	1976	1977	1978	N
1.	$126.79	$105.79	$117.93	14
2.	$107.47	$138.53	$152.40	15
3.	$160.08	$183.15	$194.00	13
4.	$129.18(n=11)	$190.92	$226.92	12
5.	$136.09	$147.09	$163.27	11
6.	$150.75	$175.06	$178.00	16
7.	$144.50	$163.69	$172.56	16
8.	$170.38	$200.77	$217.23	13
9.	$170.55	$197.55	$224.18	11
10.	$137.71	$153.29	$191.14	7
11.	$164.80	$167.80	$176.40	5

Enrolment Change Groups

Group	1976	N	1977	N	1978	N
Decreasing	$130.29	38	$133.43	44	$149.53	62
Stable	$126.92	39	$160.90	39	$194.87	23
Increasing	$165.24	55	$196.36	50	$215.50	48

Total Budget Area

	1976	N	1977	N	1978	N
Total Group	$143.86	133	$165.14	133	$181.18	133

Table 33
Total Operational Expenditures

Mean Expenditure Per Pupil in Each Group 1976 to 1978

Jurisdiction Size Groups

Group	1976	1977	1978	N
1.	$1682.36	$1732.64	$2145.50	14
2.	$1398.20	$1572.27	$1770.87	15
3.	$1397.77	$1577.54	$1757.69	13
4.	$1717.09(n=11)	$1995.58	$2222.58	12
5.	$1660.73	$1864.36	$2098.64	11
6.	$1695.94	$1877.31	$2088.63	16
7.	$1621.56	$1797.88	$1975.31	16
8.	$1706.77	$1927.77	$2117.69	13
9.	$1614.55	$1765.91	$1978.00	11
10.	$1538.14	$1696.71	$1923.71	7
11.	$1638.20	$1820.20	$2013.80	5

Enrolment Change Groups

Group	1976	N	1977	N	1978	N
Decreasing	$1696.45	38	$1798.25	44	$2036.13	62
Stable	$1587.95	39	$1836.72	39	$2115.96	23
Increasing	$1553.53	55	$1726.32	50	$1919.69	48

Total Budget Area

	1976	N	1977	N	1978	N
Total Group	$1604.84	132	$1782.49	133	$2007.91	133

Table 34
Surplus (or Deficit)

Mean Expenditure Per Pupil in Each Group 1976 to 1978

Jurisdiction Size Groups

Group	1976	1977	1978	N
1.	$-20.86	$-1.79	$ 0.86	14
2.	$ 20.20	$13.33	$ 37.20	15
3.	$ 32.00	$25.77	$ 17.15	13
4.	$ 5.45(n=11)	$17.67	$ 20.00	12
5.	$ 14.45	$20.47	$ 67.09	11
6.	$ -4.81	$-1.25	$ -6.63	16
7.	$ 12.75	$19.69	$ 7.19	16
8.	$ 10.38	$10.23	$ 2.23	13
9.	$ 7.64	$25.27	$-25.64	11
10.	$ 7.71	$36.00	$ 32.29	7
11.	$ 0.60	$19.00	$ 9.40	5

Enrolment Change Groups

Group	1976	N	1977	N	1978	N
Decreasing	$-3.24	38	$ 1.66	44	$17.84	62
Stable	$ 6.10	39	$13.15	39	$21.61	23
Increasing	$16.98	55	$28.28	50	$ 4.10	48

Total Budget Area

	1976	N	1977	N	1978	N
Total Group	$7.95	132	$15.04	133	$13.53	133

Table35
Total Expenditures

Mean Expenditure Per Pupil in Each Group 1976 to 1978

Jurisdiction Size Groups

Group	1976	1977	1978	N
1.	$1716.86	$1782.64	$2197.57	14
2.	$1434.33	$1637.27	$1820.33	15
3.	$1432.69	$1613.77	$1791.23	13
4.	$1751.00(n=11)	$2024.17	$2269.75	12
5.	$1691.18	$1890.82	$2169.82	11
6.	$1719.50	$1895.31	$2118.31	16
7.	$1641.38	$1819.63	$2032.50	16
8.	$1724.38	$1942.69	$2133.85	13
9.	$1635.36	$1799.73	$1991.55	11
10.	$1546.29	$1736.14	$1963.86	7
11.	$1643.40	$1839.20	$2030.00	5

Enrolment Change Groups

Group	1976	N	1977	N	1978	N
Decreasing	$1724.71	38	$1813.68	44	$2072.06	62
Stable	$1606.08	39	$1882.41	39	$2180.61	23
Increasing	$1583.36	55	$1764.16	50	$1954.10	48

Total Budget Area

	1976	N	1977	N	1978	N
Total Group	$1630.77	132	$1815.22	133	$2048.26	133